# THE LANCET.

**A Journal of British and Foreign Medicine, Surgery, Obstetrics, Physiology, Chemistry, Pharmacology, Public Health, and News.**

*Telegrams*—LANCET, WESTRAND LONDON *Telephones*—GERRARD 4314 & 4315 *Offices*—423, Strand, London, W.C. 2

No. XVII. OF VOL. I., 1921. No. 5095. Vol. CC. LONDON, SATURDAY, APRIL 23, 1921. Founded 1823. Registered as a Newspaper. Published Weekly. Pp. 112—Price 1s. Annual Subscription Inland £2 2s. Abroad £2 10s.



OXFORD MEDICAL PUBLICATIONS.

*READY SHORTLY.*

STUDIES IN DEFICIENCY DISEASE.
By ROBERT McCARRISON, D.Sc., LL.D., M.D., F.R.C.P., Lieut.-Col. I.M.S., Hon. Surgeon to the Viceroy of India.
Crown 4to. Cloth. Well Illustrated.

MENTAL HOSPITAL MANUAL.
By JOHN MACARTHUR, M.R.C.S., L.R.C.P., Senior Asst. Medical Officer, London County Mental Hospital, Colney Hatch.
Demy 8vo. Cloth.

*See also page* 4.

Henry Frowde and Hodder & Stoughton,
"The Lancet" Building, 1 & 2, Bedford-street, London, W.C. 2.

THE SURGERY OF THE HEART.
By Sir CHARLES A. BALLANCE, K.C.M.G., C.B., M.V.O., M.S., F.R.C.S., Consulting Surgeon to St. Thomas's Hospital, &c.
Illustrated by 48 Figures. Demy 8vo. 10s. 6d. net.
Macmillan & Co.

JUST PUBLISHED. Medium 8vo. 912 pages. 32s. 6d. net.

THE CLINICAL STUDY AND TREATMENT OF SICK CHILDREN.

By JOHN THOMSON, M.D., F.R.C.P. Ed.,
Consulting Physician to the Royal Edinburgh Hospital for Sick Children.

THIRD EDITION.
REWRITTEN AND GREATLY ENLARGED. WITH 249 ILLUSTRATIONS.

Oliver & Boyd { London: 33, Paternoster Row. Edinburgh: Tweeddale Court.

THE EXTRA PHARMACOPŒIA.
SEVENTEENTH EDITION OF VOLUME II.
*See Advertisement Page* 2.
London: H. K. Lewis & Co. Ltd., 136 Gower-street, W.C. 1.

ON DISEASES of the LUNGS and PLEURÆ, including TUBERCULOSIS and MEDIASTINAL GROWTHS.
By SIR R. DOUGLAS POWELL, Bart., K.C.V.O., M.D. Lond., F.R.C.P., Physician-in-Ordinary to H.M. the King, &c., and SIR P. HORTON-SMITH HARTLEY, C.V.O., M.A., M.D. Cantab., F.R.C.P., Phys., St. Bart.'s Hosp.; Senior Phys., Brompton Con. Hosp.
SIXTH EDITION. With Plates from Original Drawings (6 in colours) and other Illustrations in the Text. Demy 8vo. 42s. net.
"..... of remarkable value. As for treatment, this book is a useful milestone, showing the progress made in recent years"—THE LANCET.
London: H. K. Lewis & Co. Ltd., 136 Gower-street, W.C. 1.

BY LIEUT.-COL. ROBERT HENRY ELLIOT, M.D., B.S. Lond., F.R.C.S. Eng., I.M.S. retd.

GLAUCOMA: 4s. net.
A HANDBOOK FOR THE GENERAL PRACTITIONER.

GLAUCOMA: 25s. net.
A TEXT-BOOK FOR THE STUDENT OF OPHTHALMOLOGY.

THE INDIAN OPERATION OF COUCHING FOR CATARACT. 7s. 6d. net.
H. K. Lewis and Co. Ltd.

TROPICAL OPHTHALMOLOGY.
With 7 Plates and 117 Illustrations. 31s. 6d. net.

THE CARE OF EYE CASES:
A HANDBOOK FOR NURSES, PRACTITIONERS, AND STUDENTS.
The Oxford Medical Publications.

THIRD EDITION, REVISED. JUST PUBLISHED.
PRINCIPLES OF GENERAL PHYSIOLOGY.
By WILLIAM MADDOCK BAYLISS, M.A., D.Sc., F.R.S., Professor of General Physiology in University College, London.
With 261 Illustrations. 8vo. 28s. net.
Longmans, Green & Co., 39, Paternoster-row, London, E.C. 4.

ANNOUNCING

KEEN'S SURGERY

SUPPLEMENTARY VOLUMES VII. AND VIII.

See Saunders' Advertisement on Page 3.

Price 25s. net. Post free (inland), 26s.
NINETEENTH EDITION (REPRINTED).
SQUIRE'S COMPANION.
"SQUIRE'S COMPANION is a work of great practical value to medical practitioners, as well as to pharmaceutical chemists, dispensers, and pharmacologists."—THE BRITISH MEDICAL JOURNAL.
Published by J. & A. Churchill, 7, Great Marlborough-st., London, W. 1.

ESSAYS ON THE SURGERY OF THE TEMPORAL BONE.
By Sir CHARLES A. BALLANCE, K.C.M.G., C.B., M.V.O., M.S., F.R.C.S., Consulting Surgeon to St. Thomas's Hospital, &c.
Illustrated by 125 Plates (40 in Colour) and 120 Figures.
In 2 Volumes. Medium 4to., Price 5 guineas.
Macmillan & Co.

J. & A. CHURCHILL'S LATEST BOOKS.

182 Illustrations. 21s. net, postage 9d.
KLEEN'S MASSAGE AND MEDICAL GYMNASTICS.
"*A most valuable contribution ..... admirably produced.*"—LANCET.
Translated by MINA L. DOBBIE, M.D., B.Ch.

8s. 6d. net, postage 4d.
NOTES ON DISEASES
Treated by MEDICAL GYMNASTICS and MASSAGE.
By Dr. J. ARVEDSON. Translated by MINA L. DOBBIE, M.D., B.Ch.

22 Illustrations. 7s. 6d. net, postage 3d.
THE FORMATION OF COLLOIDS.
By THE SVEDBERG, Prof. of Phys. Chemistry in the Univ. of Upsala.

8 Illustrations. 7s. 6d. net, postage 4d.
CRITICAL MICROSCOPY.
HOW TO GET THE BEST OUT OF THE MICROSCOPE.
By ALFRED C. COLES, M.D., D.Sc.

27 Illustrations. 9s. 6d. net, postage 4d.
PHYSICAL SIGNS IN THE CHEST AND ABDOMEN.
By A. J. JEX-BLAKE, M.D., F.R.C.P.

1350 Illustrations. 25s. net, postage 1s.
A TEXT-BOOK OF BOTANY. For Medical & Pharmaceutical Students.
By J. SMALL, D.Sc., Ph.C., F.L.S.

38 Illustrations. 30s. net, postage 1s.
THE HEALTH OF THE INDUSTRIAL WORKER.
By E. L. COLLIS, M.D., Mansel Talbot Prof. of Prev. Med.; and M. GREENWOOD, M.R.C.P., Medical Officer (Medical Statistics), Ministry of Health. Introduction by Sir G. NEWMAN, K.C.B., F.R.S.

*STUDENTS' SYNOPSIS SERIES.*
BACK & EDWARDS' SURGERY. 15s. net.
"*When all is good it is difficult to pick out portions for praise. Before examination a kind of vacuum cleaner to remove cobwebs, and as a purge for verbosity.*"—THE LANCET.
JOHNSTON'S REGIONAL ANATOMY. 6s. net.
BURNET'S MATERIA MEDICA. 4s. 6d. net.
JAMESON & MARCHANT'S HYGIENE. 6s. net.
ROBERTS' PHYSIOLOGY. 15s. net.
COW'S PHARMACOLOGY. 7s. 6d. net.
UNDERWOOD'S DENTISTRY. 9s. 6d. net.

London: J. & A. CHURCHILL, 7, Great Marlborough Street, W. 1.

By Appointment
To H.M. King George V. To H.M. Queen Alexandra.

**Jeyes' Fluid**—Best and Safest Disinfectant.

**Cyllin**—**Jeyes' Special Fluid.**—The relatively non-poisonous Bactericide.

**Cyllin Medical**—A refined preparation of Cyllin. 24 to 26 times the strength of pure carbolic acid.

**Cyllin Capsules**—Stomachic and Intestinal.

**Jeyes' Lysol (Jeysol)**—Makes a clear solution. 2½ times the strength of pure carbolic acid.

**BRANALCANE.** The effective non-poisonous remedy for ULCERATED, RELAXED, and DIPHTHERITIC SORE THROATS, &c.
In 2-oz., 6-oz., or 12-oz. bottles.

**Jeyes' Sanitary Compounds Co., Ltd., 64, Cannon Street, London, E.C. 4**

Mono-Methyl-Di-Argent-Amine

The above new SILVER salt has been prepared by the Grèmy Laboratories, Paris, and presented in a stable form as a weak ammoniacal solution :—

# COCCIDAL

This body has been found to possess a HIGH MICROBICIDAL POWER, and being NON-IRRITANT to mucous membranes promises to be of great value in the treatment of **DISEASE IN THE URINARY TRACT.**

A short introductory Pamphlet on its properties and application in ACUTE and CHRONIC GONORRHŒAL URETHRITIS will be sent to the Medical Profession on application to

**MODERN PHARMACALS LTD.,** 48, Mortimer Street, LONDON, W. 1.

# LESLIES' ZŌPLA

(ZINC OXIDE PLASTER) **Formerly Zincoplast.**

***THE PERFECTED SURGICAL PLASTER.***

**Instantly Self-adhesive. Will not slip wherever put. THE ONE REAL NON-IRRITATING PLASTER. Will keep without drying up.**

Supplied on White and Flesh-colour Cloths, also on Holland on Spools ½" to 4" wide in 5 or 10 yard lengths in rolls 7" and 12" wide. Also on moleskin chamois leather, felt, and waterproof cloth. **SAMPLES ON REQUEST**

*ZŌPLA is made by the firm with the reputation for BROWN HOLLAND STRAPPING (Original make).*

[Telephone—Walthamstow 686

**LESLIES, Ltd.** (British firm throughout), **High St., Walthamstow, London, E. 17.**

# THE LANCET.

No. 5095. LONDON, SATURDAY, APRIL 23, 1921. Vol. CC.

# CONTENTS.

THE WHOLE OF THE LITERARY MATTER IN THE LANCET IS COPYRIGHT.

**A HUNTERIAN LECTURE** [abridged] on Loose Bodies in Joints. A Study of Loose Bodies Composed of Cartilage, or of Cartilage and Bone, Occurring in Joints, with Special Reference to their Pathology and Ætiology. Delivered before the Royal College of Surgeons of England on Feb. 11th, 1921, by A. G. TIMBRELL FISHER, *M.C.*, F.R.C.S., Assistant in the Orthopædic Department, St. Bartholomew's Hospital.—*(Illustrated)* ... 839

**OLIVER-SHARPEY LECTURES** on the Nature of Flutter and Fibrillation of the Auricle. Delivered before the Royal College of Physicians of London on April 12th, 1921, by THOMAS LEWIS, M.D., F.R.C.P., F.R.S., Physician to the Staff of the Medical Research Council.—Lecture II. Auricular Fibrillation.—*(Illustrated)* ... 845

**ORIGINAL ARTICLES.**

Permanent Drainage of the only Kidney. By WILLIAM HENRY BATTLE, F.R.C.S., Consulting Surgeon to St. Thomas's Hospital.—*(Illustrated)* ... 848

Researches on the Biochemistry of Germs and Other Proteins, with Special Reference to the Problems of Immunity. By DAVID THOMSON, O.B.E., M.B., Ch.B., D.P.H., Lecturer and Research Pathologist, London Lock Hospital.—Part II. Preparation of Detoxicated Vaccines.—Part III. The Compound Nature of Protein Antigens and a Probable Biochemical Explanation of "Collateral Immunity" and Non-specific Vaccine Therapy.—*(Concluded)* ... 849

Basal Metabolism and its Clinical Measurement. By H. G. EARLE, M.A., M.B.; and J. STRICKLAND GOODALL, M.B., M.R.C.P., F.R.C.S., F.R.S. ... 853

Medicine in Soviet Russia. By BORIS SOKOLOV, Professor of Protozoology at the University of Petrograd ... 874

Congenital Word-Blindness. By J. E. WALLACE WALLIN, Ph.D., Director, St. Louis Psycho-Educational Clinic and Special Schools ... 890

**CLINICAL NOTES:**

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

A Case of Tuberculous Salpingitis. By E. DRYBROUGH-SMITH, M.D., Ch.B. ... 854

A Case of Transfixion by Steel Rod. By NORMAN C. LAKE, M.D., M.S., D.Sc., F.R.C.S.—*(Illustrated)* ... 855

**MEDICAL SOCIETIES.**

Royal Society of Medicine: Section of Tropical Diseases and Parasitology: Laboratory Diagnosis of Malaria ... 856

Section of Surgery: Subsection of Proctology: Pruritus Ani ... 859

Society of Superintendents of Tuberculosis Institutions ... 860

Society of Medical Officers of Maternity and Child Welfare Centres: Infant Feeding after the Ninth Month ... 861

Société de Thérapeutique de Paris: Opotherapy and the Menopause ... 862

London Assoc. of the Medical Women's Federation: Tuberculosis in Children of School Age ... 862

**REVIEWS AND NOTICES OF BOOKS**

Le Diabète Sucré. By Professor Marcel Labbé ... 863

Diabetes. By Philip Horowitz, M.D. ... 863

Trial of Thurtell and Hunt. Edited by Eric R. Watson, LL.B. ... 863

Plantation Rubber and the Testing of Rubber. By G. Stafford Whitby, Ph.D. ... 863

Manual of Nursing Procedure. By Amy E. Pope ... 864

American Year Book of Anæsthesia and Analgesia (1917-18). Edited by F. H. McMechan, A.M., M.D. ... 864

Our Social Heritage. By Graham Wallas ... 864

A Practitioner's Vade Mecum. Fifth edition. By many Authors. Edited by Dr. Julius Schwalbe ... 864

From Cloud to Sunshine: Algiers and Algeria. Tenth edition. By Alfred S. Gubb, M.D., M.R.C.S., D.P.H. ... 865

Journal of Physiology ... 865

**NEW INVENTIONS.**

Improved Sterilisable Urethral Syringe (Dr. Frederick H. Pickin.—*(Illustrated)* ... 866

Continuous Gas and Oxygen Apparatus (Dr. K. B. Pinson). *(Illustrated)* ... 866

**LEADING ARTICLES.**

THE POSITION OF THE VOLUNTARY HOSPITALS ... 867

A SOLUTION FOR THE HOLIDAY HUDDLE ... 868

THE QUESTION OF A TRADE-UNION IN MEDICINE ... 868

**ANNOTATIONS.**

A Small Bastardy Bill ... 869

The Training of the Hospital Almoner ... 869

Lipoma of the Sucking-pad ... 870

Life after Death ... 870

Erythrædema ... 871

Non-tuberculous Apical Disease ... 871

Home Ambulance Service ... 871

Creeping Eruption ... 872

Belgian Methods of Anæsthesia ... 872

Familial Variation in Resistance to Infection ... 872

The Diet of the Weanling ... 873

"The Fight against Disease" ... 873

**SPECIAL ARTICLES.**

Ireland: The Position of Poor-law Medical Officers ... 877

Vienna: Statistics of the University Term.—American Food Supplies for Students and Scientists. Twenty-fifth Anniversary of the Discovery of the Rontgen Rays.—A Peculiar Psychical Condition after Gas Poisoning ... 877

URBAN VITAL STATISTICS:

English and Welsh Towns ... 878

Scottish Towns ... 878

Irish Towns ... 878

**THE SERVICES.**

Indian Medical Service ... 878

Royal Air Force Nursing Service ... 878

Royal Naval Medical Service ... 878

Royal Army Medical Corps ... 878

Royal Air Force ... 878

**CORRESPONDENCE.**

The Ultimate Sufferers ... 879

The Colonial Medical Service as a Career (Dr. A. D. Milne) ... 879

Delayed Reports (Dr. Herbert Jones) ... 879

Congenital Syphilis (Dr. C. Wilfred Vining) ... 880

The Figures of Venereal Disease (Mr. J. Ernest Lane, Mr. Ralph Thompson) ... 881

Herpes or Chicken-pox? (Dr. W. G. Vernquet) ... 881

The Ætiology of Subphrenic Abscess (Dr. Theodore Fisher) ... 881

Light as a Remedial Agent (Dr. R. Crawshaw Holt) ... 882

**OBITUARY.**

Henry Barnes, O.B.E., LL.D., M.D., F.R.S. Ed. ... 883

Peter Thomas Duncan, M.D., B.S. ... 883

Peter Tytler, M.D. ... 883

Frederick J. Burman, M.R.C.S., L.R.C.P. ... 883

Alfred Ernest William Ramsbottom, F.R.C.S., M.D. ... 883

**PARLIAMENTARY INTELLIGENCE.**

House of Commons: Public Health (Tuberculosis) Bill. Revised Scale of Fees for Admiralty Surgeons.—Hong-Kong Naval Hospital.—Encephalitis Lethargica.—Islington Medical Officer's Superannuation.—Dental Legislation.—Public Health (Tuberculosis) Expenses.—Ministry of Health Draft Order.—Public Health Officers (No. 2) Bill.—Medical Equipment of the Auxiliary Division.—Medical Benefit Statistics.—Pay of the R.A.M.C. Officers in India.—Summer Time and Children's Health ... 884

**MEDICAL NEWS.**

University of Cambridge ... 886

Royal College of Surgeons of England ... 886

Royal College of Physicians of Edinburgh, Royal College of Surgeons of Edinburgh, and Royal Faculty of Physicians and Surgeons of Glasgow: Pass-list ... 886

London School of Tropical Medicine: Pass-list ... 887

Entrance Board Regulations for Scottish Universities ... 869

Nursing and Midwifery Exhibition and Conference ... 876

Royal Medical Benevolent Fund ... 887

Donations and Bequests ... 887

Chadwick Public Lectures ... 887

Central London Throat, Nose, and Ear Hospital ... 887

Tuberculosis Society of Great Britain and Ireland ... 887

Federation of Medical and Allied Societies ... 887

Heritage Craft Schools, Chailey ... 887

New Commissioner of Prisons ... 888

Literary Intelligence ... 888

**NOTES, SHORT COMMENTS, &c.**

Eugenics v. Civilisation ... 892

Public Health of St. Vincent ... 892

"This Concerns *You*" ... 892

Appointments, Vacancies ... 888

Births, Marriages, and Deaths ... 888

Medical Diary ... 890

Communications received ... 890

**Synoptic Chart of Cardiac Examination.** 17" × 9½". With Explanatory 16 pp Pamphlet. Arranged by JOHN D. COMRIE, M.D., F.R.C.P.E. 4s. 6d. net, postage 9d.

*[New and Revised Edition.*

"The idea is very completely worked out and a full range of chest conditions is given ..... should be invaluable to the student working for his final examinations."—BRITISH MEDICAL JOURNAL.

**Tuberculosis in Children (Scrofulosis)**

By Prof. G. CORNET. Translated from the 2nd edition by J. B. BULLOCK, M.D., late Medical Officer Riversfield Chest Hospital, St. Leonards-on-Sea. Royal 8vo. 15s. net, postage 9d.

"The whole volume is full of interest."—THE LANCET

**Lenzmann's Manual of Emergencies,**

Medical, Surgical and Obstetric: Their Pathology, Diagnosis and Treatment. By J. SNOWMAN, M.D., M.R.C.P., M.R.C.S.

Demy 8vo. 15s. net, postage 1s. 3d.

"One of the most useful books recently published."—MEDICAL TIMES.

**Text-book of Chemistry: Inorganic and Organic, with Toxicology.** By R. A. WITTHAUS, A.M., M.D. Revised by R. J. H. SCOTT, M.A., B.C.L., M.D. Royal 8vo. 20s. net, postage 1s. 3d.

"The book may be recommended to those in search of a text-book of chemistry."—BRITISH MEDICAL JOURNAL.

JOHN BALE, SONS & DANIELSSON, LTD., 83-91, Great Titchfield Street, London, W.1.

## IMPORTANT ANNOUNCEMENT.

# THE EXTRA PHARMACOPŒIA, VOL. II.

### MARTINDALE and WESTCOTT

Just Published.

Completing SEVENTEENTH EDITION.

Vol. II. 688 + xxxii. pp.

With Index to Both Volumes.

Vol. II.
PRICE
17/6 NET.

POST FREE
18/-

VOLUME II. contains a large amount of concise information. A few of the subjects dealt with are given below, and they suggest the wide range of the book.

**Materia Medica** from the assay point of view—the evaluation of drugs.

**Biological or Physiological Standardisation.**

**Accessory Food Factors.** (The effects of heating and over-milling.)

**Organotherapy.** The active principles of Thyroid, Pituitary, Suprarenal, &c.

**Bacteriological Information** on a number of **Special Diseases** (Acne, Ankylostomiasis, Beri-Beri, Diphtheria, Dysentery, Gas Gangrene, Gonorrhœa, Influenza, Leishmaniasis, Malaria, Syphilis, Trypanosomiasis, Tuberculosis, Typhoid, Typhus, Weil's Disease), &c., &c.

**Hydrogen Ion Concentration of the Blood.** Details for preparing Standards, Colloidion "sacs," Technique.

**Iontophoresis.** The chemicals used, strengths and methods.

**Radiology.** The latest data in "X" Ray Therapy.

**Radium.** Recent valuable results.

**Clinical Analysis.** Blood, Urine, Fæces, &c.

**Staining Methods,** e.g., the Jensen-Gram method, the component parts of Giemsa's Stain, &c.

**Culture Media** for bacteriological research.

**Water, Milk, &c.,** analysis.

**Mineral Waters,** Composition, &c.

**Proprietary Medicines,** including data on the new Proprietary Medicines Bill.

*A full Descriptive Leaflet is in course of issue or will be sent on application. Particulars of Volume I. are also given.*

**Complete Work, 2 Volumes, 1920-21, price 44/6 net, post free 45/-**

**VOL. I.—Separately 27/- net, post free 27/6.**

**VOL. II.—Now Published, 17/6 net, post free 18/-**

## London: H. K. LEWIS & CO. Ltd., 136 Gower Street, W.C. 1.

PUBLISHING OFFICE: 28 GOWER PLACE, W.C. 1.

# A Hunterian Lecture

ABRIDGED

ON

# LOOSE BODIES IN JOINTS.

A STUDY OF LOOSE BODIES COMPOSED OF CARTILAGE, OR OF CARTILAGE AND BONE, OCCURRING IN JOINTS, WITH SPECIAL REFERENCE TO THEIR PATHOLOGY AND ÆTIOLOGY.[1]

*Delivered before the Royal College of Surgeons of England on Feb. 11th, 1921.*

BY A. G. TIMBRELL FISHER, *M.C.*, F.R.C.S. ENG.,

ASSISTANT IN THE ORTHOPÆDIC DEPARTMENT, ST. BARTHOLOMEW'S HOSPITAL; SURGICAL SPECIALIST AND ADVISORY SURGEON FOR JOINT CASES, APPEAL BOARDS, MINISTRY OF PENSIONS.

## I.—INTRODUCTORY.

THE subject of loose bodies in joints is not only of considerable practical importance, but in addition it constitutes a pathological problem of very great interest, the solution of which has taxed the ingenuity of surgeons and pathologists from the time of Ambroise Paré until the present day. It is scarcely surprising, therefore, that the literature upon the subject is great, and the nomenclature diverse. Unfortunately, the subject of loose bodies in joints, like that of internal derangement of the knee, in spite of the progress that has been made in recent years, is still surrounded by a cloud of mystery and imagination which not infrequently brings discredit upon our profession, and under cover of which the charlatan and "bone-setter" pursue their dangerous and unscientific methods. This cloud can only be dissipated by knowledge of underlying pathological principles. The present article does not discuss the group of loose bodies comprising those formed of unorganised fibrin, fibrous tissue, fat, &c., but confines itself to those bodies formed of cartilage, or of cartilage and bone combined, occurring in joints. Foreign bodies in joints also form a class by themselves and do not come within the scope of this paper.

## II.—PATHOLOGY AND SYMPTOMATOLOGY.

The loose bodies of cartilage, or of cartilage and bone, under consideration may be classified into three groups.

GROUP I.—Loose bodies occurring in connexion with some more or less general pathological process affecting the joint, such as: (*a*) osteo-arthritis; (*b*) tabes; (*c*) tuberculous disease accompanied by necrotic caries; (*d*) acute arthritis due to infection.

GROUP II.—Loose bodies occurring in joints that are otherwise apparently normal: (*a*) bodies having the microscopic, and frequently the macroscopic, appearances of detached portions of the articular surfaces; (*b*) bodies derived from inter-articular fibrocartilages; (*c*) bodies formed from detached epiphyses not forming portions of an articulating area.

GROUP III.—Synovial chondromata, laminated and non-laminated: (*a*) single; (*b*) multiple; (*c*) diffuse.

### GROUP I.—*Loose Bodies Occurring with Some General Pathological Process Affecting the Joint.*

A. *Loose bodies occurring in osteo-arthritis.*—(1) Synovial chondromata; (2) detached osteophytes; (3) detached epiarticular ecchondroses.

1. *Synovial chondromata in osteo-arthritis.*—These will be dealt with below under Group III., as they present the same naked-eye and microscopic appearances as the synovial chondromata that occur unassociated with osteo-arthritis. They cannot be said, therefore, to be the typical osteo-arthritic loose body, which distinction belongs to the detached osteophyte to be dealt with below.

2. *Loose bodies formed by detached osteophytes.*—It is to John Hunter that we owe the first description of this mode of origin of loose bodies. Bodies of this category have certain definite features which differentiate them from the other varieties, and by which they may at times be readily recognised. They are peculiarly exposed to injury in certain situations, and it is not surprising, therefore, that they may become detached, either completely or incompletely, and in the latter case are often found attached by pedicles of varied thickness to the joint margins. When completely detached the fractured surface of the chrondro-osteophyte may be recognised, but later this may become covered by outgrowth from the surrounding cartilage. In section these bodies are usually somewhat pyriform. The more pointed extremity is less thickly covered with cartilage than elsewhere, and may be regarded as the spot where the osteophyte was attached to the parent bone, the fractured surfaces having become covered with cartilage of new formation.

Microscopical examination of a chondro-osteophyte shows features of great interest, which clearly differentiate this variety from the two other types to be described later, with which it is liable to be confused—i.e., the synovial chondroma and the "classical" type of loose body derived from the articular surface. A section through the entire body shows that the periphery consists of well-developed fibrocartilage with comparatively few, but uniformly distributed, cells. The latter differ from those of connective tissue in that the nuclei are spherical, although they are as yet unsurrounded with capsules. This fibrocartilage is invested with a zone of fibrous tissue furnished with flattened cells as in a perichondrium. In this fibrocartilage occur areas of hyaline cartilage. The bone in the centre consists of well developed cancellous tissue, but is quite dead. The lacunæ are empty, and devoid of any stained elements. The contents of the spaces are mostly groups of fat cells, but there are no stained nuclei either in the fat cells or other tissues. At the junction of the osseous centre and the surrounding cartilage there is, in places, a zone of calcified cartilage between the fibrocartilage and the proper dead cancellous bone, the cartilage cells in this zone being alive, but the bone corpuscles dead. The overlying cartilage has nowhere the characters of normal articular cartilage, and there are no proper elongated or other groups at the free aspect.

To sum up: A detached osteophyte forming a loose body in a joint has definite naked-eye and microscopic appearances by which it may be recognised. It is very unusual for more than two or three of these bodies to be found in the same joint, and there is often only one of this variety present. In the same joint, however, there may co-exist cartilaginous loose bodies derived from synovial fringes.

3. *Detached epiarticular ecchondroses.*—Professor S. G. Shattock was the first to point out that bodies of the same essential nature as the periarticular ecchondroses growing from the articular margins might arise in the substance of the cartilage covering the normal bone. This takes place by local hyperplasia of the cartilage, in which central ossification subsequently occurs (Path. Trans. xl.).

These observations suggest (as Professor Shattock observes) that in certain cases the separation of such might lead to the production of loose bodies of a kind similar to those which are at times detached from the articular margins.

B. *Loose bodies occurring in tabes.*—These resemble the bodies described in the last group, but all the processes tend to become greatly exaggerated, so that the loose bodies, whether formed from synovial fringes or by detachment of osteophytes, are as a rule larger. In tabetic joints, especially in the "hypertrophic" form, the osteophytes may be indeed enormous; moreover, the formation of bone involves the planes of connective tissue between the capsule and the synovial membrane, so that the joint may be surrounded eventually by bony masses, sometimes accurately articulated.

C. *Loose bodies occurring in tuberculous disease accompanied by necrotic caries.*—Tuberculous necrosis of considerable portions of bone is not a common condition. It affects more frequently the articular end of the femur, and is probably due to interference with the blood-supply of the affected portion, which may account for the wedge-shaped or conoidal form of these sequestra. A remarkable feature is the slowness of the process by which their separation is accomplished.

D. *Loose bodies occurring in acute arthritis due to infection.*—These occur in the following forms: (1) Flakes of necrotic articular cartilage of variable size; (2) bony sequestra; (3) the whole of the articular end, when the epiphysis is intracapsular, may necrose and be found quite loose in the joint. (Fig. 1.)

### GROUP II.—*Loose Bodies formed by Detachment of a Portion of the Articular Surface and occurring in otherwise Normal Joints.*

*General Characteristics.*

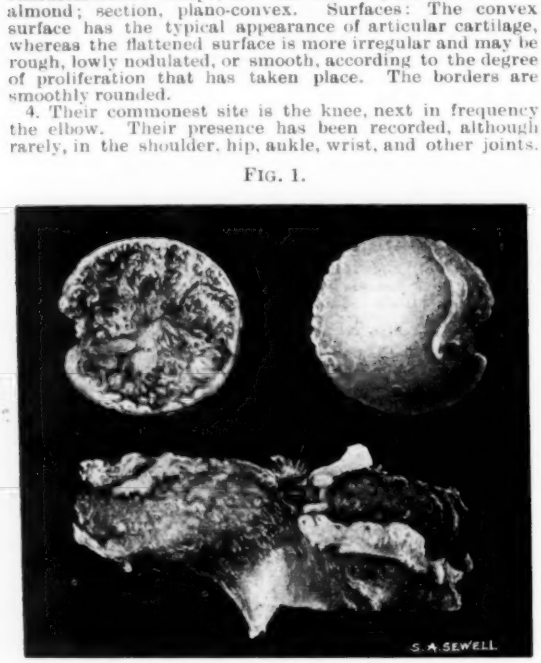
1. They occur more frequently in males than in females.
2. The commonest age-incidence is between the years of 15 and 25.
3. The type of loose body most frequently seen I have termed the "classical" form. This form has the following

[1] Published in more detail, and with 32 illustrations, in the current number of the British Journal of Surgery.

characteristics:—Shape, circular or oval; size, that of an almond; section, plano-convex. Surfaces: The convex surface has the typical appearance of articular cartilage, whereas the flattened surface is more irregular and may be rough, lowly nodulated, or smooth, according to the degree of proliferation that has taken place. The borders are smoothly rounded.

4. Their commonest site is the knee, next in frequency the elbow. Their presence has been recorded, although rarely, in the shoulder, hip, ankle, wrist, and other joints.

FIG. 1.




Head of femur forming loose body in acute infective arthritis Natural size. [721 A, St. Thomas's Museum.]

In the case of the knee-joint they are usually derived from the articular surface of the femur or patella, and but rarely from that of the tibia.

5. Although usually single, occasionally two or even three of these bodies may be present in a joint.

6. The bodies may be completely or incompletely detached or may acquire a secondary adhesion to the synovial membrane. When incompletely separated they are usually attached by a hinge of articular cartilage to the margin of a defect or loss of substance in the articular surface which corresponds in size and shape to the loose body. In cases where more than one body is present, these may be quite free, or one may be incompletely detached and the remainder free.

7. Cases are recorded where such a gross detachment by injury as the head of the femur or of the radius may occur and form a loose body in the joint.

8. Their continued presence in a joint may bring about secondary changes of an osteo-arthritic nature.

9. These loose bodies themselves undergo certain remarkable changes in the joint which will be dealt with in detail below.

10. The part that trauma plays in their ætiology has been a subject of great controversy, and we will defer our conclusions upon that question until we have critically examined the series of cases to be next described.

11. They are occasionally bilateral and symmetrical (Bowlby, Clutton, Weichselbaum).

*A. Loose bodies having the appearances of detached portions of the articular surfaces.*—Classification: I have adopted the following subdivisions: (1) Recent detachments. Bone (where present) and articular cartilage living. No proliferative changes in articular cartilage. (2) Bodies whose sojourn in the joint has been longer. The articular cartilage shows proliferative changes. The "classical" type of loose body. (3) Marked degree of proliferation of cartilage. (4) Excessive proliferation of cartilage. (5) Feeble proliferation of cartilage. (6) Formation of new bone from the osteogenetic tissue in the cancellous spaces accompanying the formation of secondary adhesions, or incomplete detachment.

A series of cases illustrating recent detachments was then passed under review.

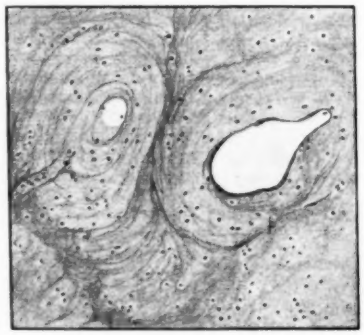
1. *Recent detachments.*—In this series a portion of articular cartilage, with or without a layer of the subjacent bone, is detached by direct or indirect violence. The following cases are typical examples representing four different varieties. Cases 1 and 2, detachment of articular cartilage and bone by direct violence; Case 3, detachment of articular cartilage and bone by indirect violence; Case 4, detachment of articular cartilage by direct violence; Case 5, detachment of articular cartilage by indirect violence.

2. *Loose bodies in which the cartilage shows proliferative changes. The "classical" type of loose body.*—In this subdivision a few cases only out of the large number examined will be passed under review. Although they are all alike in showing proliferation of cartilage, they present certain minor differences. The principal naked-eye features of this subdivision have been already described. It will be sufficient merely to draw attention again to the fact that the margins of the bodies comprising this group, instead of showing signs of recent traumatic detachment, are smooth and rounded. Many different theories have been held as to their origin, but I shall attempt to show that they are portions of the articular surface detached by trauma and not by any pathological process, and which have continued to grow until, as we shall see later, their origin may be obscured.

CASE 1.—E. J. D., 25, came under my care in November, 1919, with the following history. Before the war he had been a miner: he had never had any illness that he could remember, and had never had any joint trouble. In January, 1915, he joined the Royal Field Artillery, and almost immediately commenced to undergo the strenuous riding-school exercises. After a short time he noticed that his knee would occasionally become painful and swollen after riding. The pain and swelling recurred at intervals after strenuous exercise for about two and a half years. In August, 1917, his knee suddenly became fixed in the extended position as he was getting up to leave a train, and rapidly swelled. He was admitted to hospital with the knee locked in extension. He was treated for some months as a case of "arthritis," and the limb was immobilised by splints. The treatment caused the swelling to subside, but whenever he attempted to walk the pain and swelling recurred, and the limb was immobilised once more. After a long period of immobilisation the tendency for pain and swelling to occur after exercise subsided, and he was ordered a course of gymnastic exercises to remove stiffness that was present, and he was so far improved that he was able to return to duty in February, 1918, and returned to France again the following month. The result was disastrous; the pain and swelling constantly recurred, and at length, in December, he was discharged the Service permanently unfit. After discharge his symptoms continued, but in addition he became subject to attacks of severe pain in the joint which caused him to fall to the ground. In November, 1919, he was going up some steps when his left knee suddenly "twisted inwards" and became locked in a semiflexed position, so that he was unable to straighten it.

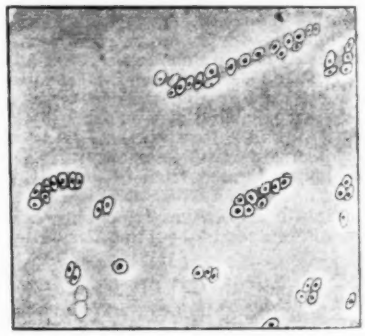
When I saw him there was a considerable amount of effusion in the joint, and any attempt to extend the leg upon the thigh caused severe pain, more marked beneath the patellar ligament. At first sight this appeared to be a case of internal derangement of the knee due to injury and displacement of the internal semilunar cartilage. However, as all attempts to unlock the joint were unsuccessful, the patient was X rayed and a loose body revealed. At operation I found the loose body lying in the depression of the articular surface of the external condyle of the tibia between the external semilunar cartilage and the tibial spine. It was easy to see how its position mechanically blocked full extension of the leg. It was attached by a pedicle to the posterior crucial ligament in the region of the intercondylar notch. After division of the pedicle the loose body was removed, and the patient made an uninterrupted recovery.

FIG. 2.



Living bone corpuscles. [722 St. Bart.'s.

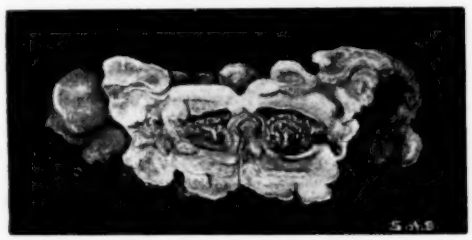
FIG. 3.



Living cartilage cells. [722 St. Bart.'s.

From a consideration of the history it appears probable that during the riding exercises a portion of articular cartilage was gradually detached, probably by ligamentous strain or muscular spasm, and that eventually it became completely detached and caused the first locking of the joint. Afterwards the body perhaps acquired a secondary attachment to the synovial membrane over the crucial ligament, which, on stretching, gave rise to the second period of locking. Incidentally the history shows the difficulties and pitfalls that lie in the path of the clinician in these cases. The patient's condition remained undiagnosed for nearly four years; he suffered much pain and discomfort, and was eventually discharged "permanently unfit." An exploratory arthrotomy might have at once revealed the condition,

FIG. 4.



Loose body derived from articular surface showing striking degree of proliferation. Natural size. [1931 B, R.C.S.]

spared him years of suffering, and supplied another soldier for the firing line.

*Microscopical appearances.*—A portion cut from the dried specimen after immersion in water regained its normal appearance; and microscopic sections, after staining with hæmatoxylin, displayed well-stained cartilage cells throughout—i.e., it is not a sequestrum.

I am indebted to Mr. Percy Sargent for loan of the following specimen.

CASE 2.—W. G., aged 20, came under Mr. Percy Sargent's care in May, 1920, with the history that nine months ago he "ricked" his right knee whilst swimming, and experienced severe pain in the outer side of the joint, and almost immediately after noticed a freely movable body in this situation. No locking occurred, but movements were painful. Afterwards the knee was apt to give way suddenly about once a fortnight, with excruciating pain—the loose body on these occasions being felt as before at the outer side of the joint. There was never any actual locking.

On admission the knee was slightly swollen and the synovial membrane thickened. Movements of the joint were full, and no loose body could be felt. There was some wasting of the thigh. Mr. Sargent obtained access to the joint by the vertical median division of the patella. The body lay quite loose behind the patella.

The loose body has the characteristics of the "classical" type already mentioned. The rounded bodies are well seen, and the deep surface shows that the articular cartilage has extended from the margin of the body over the surface of the bone. This process is more advanced than in Case 1.

*Microscopical appearances.*—From the fractured edge of the original large-celled articular cartilage a cushion of small-celled cartilage has been produced, which extends over the edge and over the under side of the fractured bone. The bone itself is necrosed, the corpuscles in the trabeculæ ceasing to take a nuclear stain. The connective tissue within the cancellous spaces is quite dead; the forms of the fat cells in the cancellous spaces, however, being still recognisable.

At the top of the specimen is seen the free surface of the reparative tissue or "callus," which has spread from the proliferating fractured edge of the articular layer, over the opposite aspect of the fractured surface of the bone, as indicated by the fissure between the two.

The reparative tissue is well developed on the deep aspect, the cartilage cells being furnished with well-pronounced capsules. One process has intruded itself into one of the cancellous spaces laid open by the fracture. At the lower right-hand side another elongated cancellous space is completely filled with a deeper intrusion of cartilage, the matrix of which is coloured a vivid blue; there were several adjacent spaces occupied with similar newly formed cartilage. The lacunæ of the osseous trabeculæ are quite empty, the bone itself being dead.

[Professor Fisher next described the microscopical appearances in a number of other cases somewhat similar to the last but presenting minor differences.

In Case 6 (Spec. No. 722, St. Bart.'s Museum: Figs. 2 and 3), although in the absence of any history of injury it had previously been inferred that the body had become detached through "quiet necrosis," yet microscopic examination shows that the cartilage cells and bone corpuscles are all living.]

3. *Loose bodies exhibiting a striking degree of proliferation.*—The phenomena presented by this subdivision are truly remarkable; the cartilage cells proliferate with such exuberance that veritable cartilaginous tumours are formed. In the centre of the body can be seen the fragment of the articular surface originally detached.

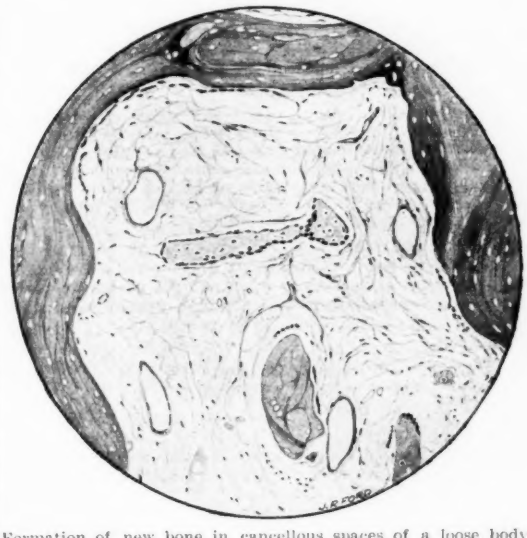
CASE 1.—Consists of two loose bodies of unusually large type which were removed from a knee-joint. They are both somewhat discoidal in form, and have a remarkably irregular, coral-like exterior, like some of the osteomata growing from the ends of the long bones; the larger has a chief diameter of 2½ in. The smaller of the two bodies has in the centre a nucleus of dense osseous tissue which is covered on one aspect by a layer of cartilage having the appearance of articular cartilage. Next succeeds a thick crust of cartilage which is obviously laminated in a circumferential manner. This external crust is traversed in places by fissures which have for the most part a radial arrangement. The accompanying description states: "They were removed from the knee-joint of a labourer, aged 25. The loose bodies lay in the cul-de-sac beneath the quadriceps extensors, and were very freely movable. The patient noticed a swelling in that situation after a fall on the knee five years previously. The margins of the femur were lipped but there was no other evidence of osteo-arthritis."

CASE 2 (Spec. 1931B, Museum, R.C.S., Fig. 4), is an equally remarkable example of very marked degree of proliferation of the articular cartilage. The short accompanying description states that: "It was removed by operation from the knee-joint of a man, aged 55, who had been unable to flex his leg to the full extent for some months. A hard movable body could be felt in the suprapatellar recess of the joint previous to operation. There were evidences of rheumatoid arthritis in the knee."

4. *Feeble proliferation of articular cartilage.*—This is a rare condition, and is represented by but one example among the large number examined in the course of this research. This specimen, kindly lent me by Professor M. J. Stewart, of Leeds, is the one described by Teale, who considered that it had been gradually exfoliated after injury.

Microscopical examination. The cartilage cells towards the free surface stain feebly (possibly the result of imperfect fixation). More deeply the groups of cells and their nuclei are sharp and the nuclei fairly, not intensely stained. On the free deep side here and there are portions of large-celled cartilage.

FIG. 5.



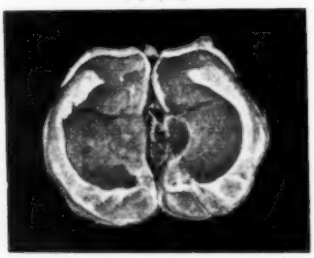
Formation of new bone in cancellous spaces of a loose body accompanying secondary adhesion to synovial membrane.

5. *Formation of new bone from osteogenetic tissue in cancellous spaces accompanying the formation of secondary adhesions or incomplete detachment* (Fig. 5).—In the cases hitherto described it is to be noticed that no case demonstrates new bone in process of formation. The cancellous spaces contain merely necrotic tissues, and no living and active osteogenetic cells. It will have been noted that these bodies were all quite free in the joint. The examples of the subdivision we have now to consider were found at operation to have acquired a secondary adhesion to the synovial membrane or to be incompletely detached. In this variety we find that the cancellous spaces still contain living contents and vessels, and that although many of the deeper bone corpuscles—that is, those lying nearer to the articular cartilage—are dead, yet the more superficial cancellous

spaces contain osteogenetic tissue actively engaged in laying down new bone upon the surface of the old. There can thus be little doubt that a loose body may, if attached secondarily to the synovial membrane or if incompletely detached, increase in size, not only by proliferation of its cartilage cells, but also by formation of new bone. Moreover, it appears that, should secondary detachment of the loose body occur, the formation of bone ceases, whereas the cartilage continues its growth. This increase in bony substance of an attached loose body is important from the ætiological point of view, as we shall see later, particularly in those cases where a loose body attached to the crucial ligament of the knee-joint occupies a pit on one or other femoral condyle. At first sight it would appear difficult to understand how such a body could be detached by traction of the ligament, unless we realise that the bone has probably continued its growth after incomplete detachment.

B. *Loose bodies derived from interarticular fibro-cartilages.*—The subject of injuries to the semilunar cartilages of the knee-joint is a large one, and is beyond the scope of the present article; I am, moreover, making it the subject of a further research. It will suffice to mention here that a portion of one of the semilunar cartilages—usually the anterior end of the internal semilunar—may occur as a rounded cartilaginous body, either attached by a pedicle of variable thickness to the remainder of the cartilage, or the pedicle may rupture and the body become quite free.

FIG. 6.



Epiphysis of ext. condyle of humerus forming loose body in elbow-joint. Natural size. [714 c, St. Bart.'s.]

I have seen the internal semilunar cartilage completely detached from its site and with a secondary attachment round the periphery of the patella. Occasionally the posterior horn of one of the semilunars may form a pedunculated loose body in the joint.

C. *Loose bodies formed by detached epiphyses not forming portions of an articulating area.*—(Spec. 714C St. Bart.'s Hospital, Fig. 6.) This loose body was removed by Sir Charles Gordon Watson from the elbow-joint of a boy, age 17, in whose joint it had been present for four years. There can be little doubt that the body is a detachment of the epiphysis of the external condyle of the humerus. One surface of the loose body is convex and lowly nodulated, the other surface being concave. The section shows that there is a nucleus of bone in the centre, and that the convex aspect is covered by a thick layer of cartilage, which has also apparently spread over the concave detached surface. This cartilage has none of the characteristics of articular cartilage.

GROUP III.—*Synovial Chondromata, Laminated and Non-Laminated.*

They may be divided into three classes: (*a*) Single (Fig. 7), pedunculated or free; (*b*) Multiple, pedunculated, free, or the two conditions combined; and (*c*) Diffuse (Fig. 8), usually associated with free bodies in the joint cavity. The discovery by Kölliker of cartilage cells in the villi of the synovial membrane and the observations of Rainey have already been referred to in Section I. The loose bodies of the important group we are about to pass under review, although they may differ in structure and form, have the common characteristic that they have originated from the cartilage cells of the synovial villi, and are, therefore, true chondromata. It is impossible in the present state of our knowledge to assign a cause for this behaviour of the cartilage cells. In many cases there is a history of injury; in others this is absent, and they often appear to occur in the course of chronic synovitis. Whether, however, the presence of the synovial chondromata caused the synovitis, or the latter was the exciting cause of the tumour formation, it is impossible in many instances to say.

[Professor Fisher then described the naked-eye and microscopical features of the three classes of synovial chondromata.]

III.—ÆTIOLOGY AND PATHOLOGICAL DEDUCTIONS.

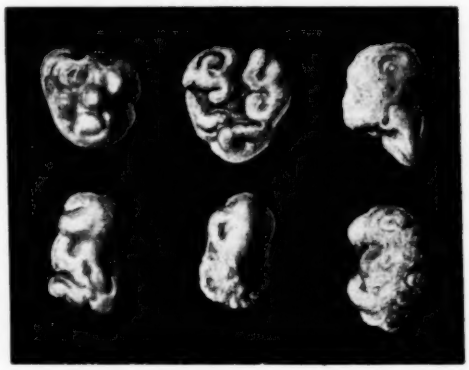
In the present stage of our knowledge it is impossible to dogmatise upon the ætiology of the more important loose bodies of Group I.—i.e., the osteophytes, since it is bound up with the larger question of the ætiology of osteo-arthritis. Similarly, the ætiology of Group III., the synovial chondromata, is bound up with the larger question of the ætiology of tumours. Although it is probable that the cartilage cells in the synovial villi from which they originate are, as Professor Shattock pointed out, derived from the primitive cartilaginous bar which in the developing embryo becomes cleft to form the knee-joint, the periphery remains to become the capsule and synovial membrane. Trauma, however, may undoubtedly be a contributory factor. In one of my cases the patient was struck a severe blow just above the patella a year previous to the X ray examination, which revealed multiple synovial chondromata developing in the suprapatellar joint recess. This section will therefore deal principally with the ætiology of the type of loose body derived from the articular surface (Group II., Class I.).

A.—*Deductions from the Pathological Data.*

1. When composed of articular cartilage only the later, so far from being necrosed, is perfectly healthy (except, perhaps, in the Teale case) and in many cases actually proliferates. Anything more unlike a sequestrum in its behaviour it would be impossible to imagine.

2. In the large series examined there were no signs of any pathological process, such as pitting due to phagocytic action such as a sequestrum shows, and no layer of granulation tissue or fibrous tissue on the deep surface. On the other hand, the deep surface had in many cases all the appearances of a fractured surface. The series examined has included many of the specimens from pathological museums labelled "quiet necrosis."

FIG. 7.



Multiple chondromata of synovial membrane. Natural size. 720 B, St. Bart.'s.]

3. In those cases where it has been possible to ascertain whence they have arisen, they are found to arise from those parts of the joint surfaces most exposed to injury.

4. They often present to the naked eye the form of grooves on the articular surface associated with fracture of the subjacent bone of traumatic origin.

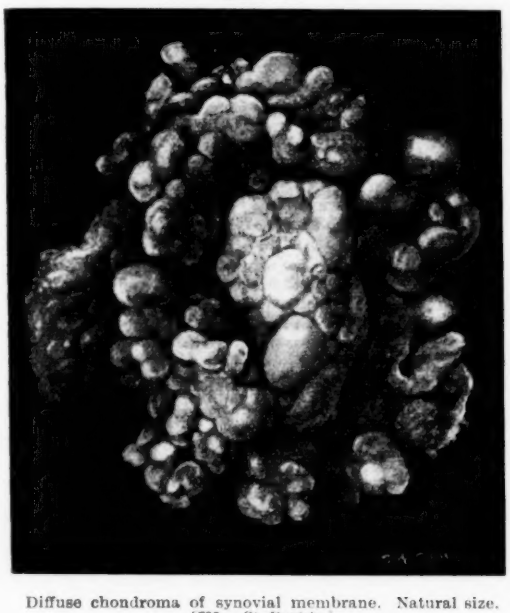
5. Although many of the bone corpuscles are dead in cases where the loose body consists of bone in addition to cartilage, yet it is clear that their death has taken place *after* and not before detachment, and this fact cannot therefore be adduced in favour of some pathological process such as "quiet necrosis." In the experiments to be described below, identical appearances are seen, and here there can be no question that the death of the bone corpuscles must have taken place *after* detachment of the loose body. We see exactly the same behaviour of the bone corpuscles in experimental bone grafting, for Hey Groves, Axhausen, and others have shown that the majority of the bone corpuscles in a bone graft die. We shall refer to this again later under conclusions. Moreover, as previously mentioned, in the only case in the whole series where there was no history of injury, and where we should expect to see marked evidence of some pathological process, such as "quiet necrosis," we find that the bone corpuscles are all living.

To sum up the pathological data, the naked-eye and microscopical features of this group of loose bodies demonstrate that they are detached by trauma.

B. *Deductions from the Clinical Data.*

1. *Traumatic factor.*—Martens, who made an analysis of Konig's cases, found that out of a series of 54 cases there were 20 with a definite history of antecedent trauma, and 34 where this was absent or of an insignificant nature. But, as we have shown above, all figures not based upon microscopic examination of every case are fallacious, owing to the way in which the solitary osteo-arthritic loose body may simulate the traumatic type. In my own series of cases quoted above, all of which were examined microscopically,

FIG. 8.



Diffuse chondroma of synovial membrane. Natural size. [720 c, St. Bart.'s.]

there were 16 cases; of these, 3 cases had no accompanying history, and may be discarded for statistical purposes, leaving 13 with an accompanying history. In 12 out of the 13 there was a definite history of antecedent trauma, 6 being cases of direct and 6 of indirect injury. In only 1 case was there no history of antecedent injury, yet in this case not only the cartilage cells but all the bone corpuscles were perfectly healthy, and there was no sign whatsoever of any morbid process. The clinical evidence from this source strongly supports, therefore, the traumatic origin of this group. Further to investigate this point I searched through the surgical records of St. Bartholomew's Hospital, and found that in the last 17 years there have been 20 cases of solitary loose body operated upon. These were not all examined microscopically, and therefore almost certainly include a certain number of the solitary pathological variety, yet in no less than 80 per cent. of these cases was there a definite history present. If we were able to exclude the pathological type in this series it is obvious that the percentage would be still greater. Surely it is reasonable to assume that in the small percentage of cases remaining, in which no history of injury is present, leading questions were asked as to a direct injury and the possibility of indirect was overlooked or forgotten.

But it may be asked, How can indirect injury lead to a detachment of a portion of the articular surface? I believe that in many cases they are pulled off by the crucial ligaments, and it is certainly remarkable that these bodies are commonly derived from the area near the attachment of one or other crucial ligament. In the knee-joint of a full-term fœtus, by fully flexing the knee and then internally rotating, a very large piece of the inner portion of the external condyle of the femur can be wrenched off. Then another and, I believe, not infrequent detachment by indirect injury is produced by violent tension upon the posterior ligament of the knee-joint, which, it will be remembered, is attached immediately adjacent to the articular margin and is powerfully reinforced by the tendons of the gastrocnemius and semimembranosus muscles.

Sir Anthony Bowlby has drawn attention to a specimen in St. Bartholomew's Museum consisting of two portions of cartilage which were removed by operation from the knee-joints of a boy, age 18, by Holden, and each exactly resembles the cartilage over the posterior aspect of the condyles. There was a year's interval between the two operations.

2. *Interval occasionally occurring between injury and onset of classical symptoms of a loose body.*—Supporters of the theories of "quiet necrosis" or "osteochondritis dissecans" lay considerable stress upon this interval. Yet the interval can be satisfactorily explained if we bear in mind that the classical symptoms are due to the loose body being caught between the articular surfaces, this giving rise to sudden attacks of pain or even locking. If the loose body has become attached to the synovial membrane in such a position that it is unable to wander freely about the joint or get between the articular surfaces, or if it has not been completely detached and occupies a pit in the articular surface, then the classical symptoms may not arise. Should it eventually become completely free more definite symptoms may arise.

The clinical evidence would therefore appear to favour strongly the traumatic origin of loose bodies of the "classical" type.

C.—*Deductions from Experimental Observations.*

1. *Experiments upon the cadaver.*—Although it is scarcely logical to argue from the dead to the living, yet I have been able, exercising quite moderate violence, to detach, both completely and incompletely, portions of the articular surface of the femoral condyles in the cadaver. I found that a blow by a hammer upon the lateral margin of the condyle produced a detachment of a portion of articular cartilage, this detachment usually occurring through the brittle calcified zone. If, however, the surface of the condyle was struck, a much greater degree of violence was necessary to detach a portion of the articular surface. I have already referred to my artificial production of loose bodies by tension upon the crucial ligaments.

2. *Experiments upon animals.*—These yield results of great interest. I describe here a typical experiment upon the knee-joint of a rabbit, where a small portion of the articular end of the femur was detached by a chisel after opening the joint, the artificially produced loose body being subsequently examined. First operation: The right knee-joint of a rabbit was opened from the inner side. A small portion of articular cartilage with a portion of the subjacent bone was chiselled off—the portion involving the inner lip of the trochlear surface of the femur and a small portion of the inner condyle of the femur. The portion was completely detached and pushed up into the suprapatellar recess of the joint. The joint was then closed, the incisions in the capsule and skin being separately sutured with catgut and a collodion dressing applied. Second operation: The joint was reopened five weeks later, and the loose body found to have acquired a secondary attachment to the synovial membrane of the suprapatellar pouch. This attachment was divided with scissors and the loose body removed.

Microscopical examination revealed general features resembling a loose body of the classical type in that the majority of the cartilage cells are perfectly healthy but many of the bone corpuscles are dead. But the latter must have died *after* detachment; therefore it seems reasonable to assume that the bone corpuscles in the classical type of loose body have also died after the detachment by trauma, and that their death is not due to any morbid pathological process. The experimental data, in addition to the pathological and clinical data, are thus consistent with the traumatic origin of the classical type of loose body occurring in joints.

*Deductions upon Cartilage Vitality Growth and Repair to be Drawn from a Study of the Pathological Data.*

*A. Vitality of articular cartilage.*—The first fact of interest to be noted is that the behaviour of the cartilage cells demonstrates that their vitality has been considerably underestimated. A loose body of the traumatic type when free in a joint is essentially an autoplastic graft surrounded by the synovial fluid, and when the loose body is composed of both cartilage and bone we have an excellent opportunity of observing and comparing the behaviour of these two substances. One then observes that the cartilage cells retain their vitality in almost every case and after a time actively proliferate, but that the majority of the bone corpuscles die, as do also the contents of the bony spaces. As we have mentioned previously, we see the same difference in behaviour between cartilage cells and bone corpuscles after transplantation of joint ends.

*B. Growth and repair of articular cartilage.*—Present-day teaching is largely based upon the experiments of P. Redfern, performed in pre-antiseptic days. The general conclusions drawn from these experiments was that cartilage cells were destitute of the powers of repair. Yet there can be no doubt that the phenomena described above refute the conclusions arrived at by the earlier experiments. At present I am performing a series of experiments upon animals in order further to investigate growth and repair in cartilage, and which will be made the subject of a further communication.

*C. Growth and repair of cartilage other than articular.*—Professor Shattock has kindly allowed me to reproduce in this connexion one of his hitherto unpublished observations, showing the reparative production of new cartilage from the cut edges of one of the tracheal rings which was divided six years previously in a tracheotomy. The opposite edge of the cut surface of the same ring showed precisely the same repair. The actual interval between the two is filled with dense fibrous tissue. The specimen was obtained from a boy, aged 15, upon whom tracheotomy had been performed six years previously. This specimen shows with almost startling clearness that cartilage cells are capable of growth and repair.

*Application of these facts to cartilage-grafting.*—Owing to the inherent vitality of cartilage cells it is clear that the use of cartilaginous grafts in surgery is based upon sound principles. Morestin has done excellent work in this connexion, and has used autogenous grafts of costal cartilage to repair defects in the cranial wall and facial skeleton.

*Deductions to be Drawn from a Study of the "Classical" Type of Loose Body upon the Behaviour of the Bone Corpuscles in an Autogenous Graft.*

From a study of the pathological appearances in the cases that we have described of loose bodies of bone and cartilage quite free in the joint, it is clear that, except in one case, the majority of the bone corpuscles were dead, as exemplified by the lacunæ no longer holding stainable cells, and by the fact that the spaces contain nothing that stained and were, in fact, empty. Furthermore, in not a single case was there any evidence of proliferation of osteoblasts with formation of new bone. Yet we see a striking difference on examining those bodies of traumatic origin and containing bone which have acquired an early adhesion to the synovial membrane. For in these cases fresh capillaries can be seen to have penetrated the cancellous spaces, and active proliferation of osteoblasts with formation of new bone is taking place. Exactly the same thing can be observed in the experimental production of loose bodies which show secondary attachment to the synovial membrane with active proliferation of bone cells.

These observations therefore support Hey Groves's contention that the osteogenic cells in the Haversian canals and cancellous spaces of an autogenous bone-graft actively proliferate only if the graft becomes to some extent vascularised by the ingrowth of capillaries from surrounding parts. As, therefore, the vascular supply appears to be of such paramount importance in the osteogenetic function of the bone-graft it would appear to be advantageous to retain the periosteum in order to enable the graft to establish its vascular connexions as rapidly as possible. And in grafting cartilage the indication would appear to be to retain the perichondrium in order to supply an additional aid to any further production of the cartilage.

## IV.—DIAGNOSIS AND TREATMENT.

*Diagnosis of the traumatic loose bodies.*—Considerations of space will not permit the enumeration of a number of case histories, and compels me to summarise my conclusions from these. If we bear in mind the pathological and experimental data it will help us to understand the often extremely puzzling symptoms to which a loose body may give rise. We have seen that a portion of the articular surface may in the first place be incompletely detached, in which case it may lie snugly in place, flush with the articular surface; or, on the other hand, it may be capable of considerable movement. Secondly, the detached portion may be quite free in the joint. Thirdly, it may acquire a secondary adhesion to the synovial membrane.

Now the classical symptoms of a loose body, which are sudden attacks of severe pain, often followed by swelling or momentary locking, are due either to the body becoming suddenly and momentarily nipped between the articular surfaces or between the capsule and the joint ends. These symptoms cannot arise when either the body is firmly attached to the synovial membrane at some point where it cannot get between the articular surfaces or when it is incompletely detached and lies snugly in situ. Bearing these facts in mind, it is possible to describe three different groups into which the symptoms fall and place side by side with the symptoms the corresponding pathological picture.

*Group 1.*—A portion of articular surface is completely detached; wanders freely about joint; and after an interval becomes secondarily attached to synovial membrane. An injury, direct or indirect, is followed almost immediately by classical symptoms; and after an interval these disappear.

*Group 2.*—The portion of articular surface is completely detached, becomes almost immediately adherent to synovial membrane; but after an interval it becomes detached therefrom. An injury, direct or indirect, is followed by freedom from classical symptoms; but after an interval the latter symptoms arise.

*Group 3.*—A portion of the articular surface is *gradually* detached; at length it becomes freely movable or completely detached. Here the process of gradual detachment is accompanied by attacks of pain and swelling, often increasing in severity, and these are followed at last by the classical symptoms. These again may disappear when the body becomes secondarily attached to the synovial membrane.

*Symptomatology of the pathological varieties.*—The symptoms to which the solitary osteo-arthritic body or the solitary synovial chondroma may give rise are almost identical with those we have already described. When, however, multiple synovial chondromata are present, we find that, as a rule, owing to their number and smaller size, the bodies are apt to become caught between the joint surfaces much more frequently. This occurrence is, however, not associated with such pain or inconvenience to the patient as in the case of the solitary varieties.

*Treatment.*—The treatment in the case of the traumatic loose bodies and of the synovial chondromata is, in most cases, removal. In the former group, provided the aseptic technique is beyond reproach, the results are naturally good, since they usually occur in a joint that is otherwise normal. However, if the traumatic loose body has been allowed to remain in the joint long enough to cause a chronic villous synovitis or commencing osteo-arthritis, although we may cure the sudden attacks of pain due to the body becoming impinged between the articular surfaces, yet the operation may be followed by pain, swelling, and feeling of weakness in the joint due to the superimposed condition. This forms one argument for early operation, another being that the presence in a joint of a loose body is a source of danger, as when a loose body suddenly becomes impinged between the articular surfaces of the knee when crossing a crowded street. These propensities of loose bodies also interfere with athletic pursuits.

In the case of the pathological loose bodies in osteo-arthritis, an operation is usually indicated in young or middle-aged people when troublesome locking occurs and when the joint is not seriously disorganised. The operation has naturally no effect on the course of the disease, and is of a palliative nature. The results of operation in the synovial chondromata are also good, provided the condition is not progressive, for the process may end as suddenly and mysteriously as it commences. If we are lucky enough to operate when the process has come to an end the result is generally good; if not, further operations may be required. I saw recently a man who, 15 years ago, while in India had over 700 cartilaginous loose bodies removed from his left knee. On examination his knee appeared perfectly normal, and it caused him no trouble whatsoever. Any operation for removal of a loose body or bodies should be preceded by an X ray examination taken in two planes, from which we may learn how and where to open the joint. An X ray is only helpful when the loose body contains bone. In every case incision through the skin and capsule should be liberal, in order to explore the joint as thoroughly as possible. To transfix and remove the loose body through a button-hole incision is an unscientific procedure reminiscent of pre-antiseptic days, for unless we explore the joint we are very apt to overlook other loose bodies or co-existent conditions which may give rise to a recurrence of the symptoms.

It is my pleasant duty to express my indebtedness to Professor S. G. Shattock, who has throughout the research given me much help, advice, and criticism, and has also kindly placed at my disposal the pathological collections at the Royal College of Surgeons and at St. Thomas's Hospital. To the Medical Research Council, under whose auspices the research has been conducted, my thanks are also due. I am also indebted to Dr. T. H. G. Shore, Curator of the Pathological Museum of St. Bartholomew's Hospital for loan of many specimens; to my chief, Mr. R. C. Elmslie, for many helpful suggestions; and to Professor A. Keith for kindly allowing me to work at the Royal College of Surgeons, and for other valuable assistance.

# Oliver-Sharpey Lectures

ON THE

# NATURE OF FLUTTER AND FIBRILLATION OF THE AURICLE.

*Delivered before the Royal College of Physicians of London on April 12th, 1921.*

BY THOMAS LEWIS, M.D., F.R.C.P. LOND., F.R.S.,

PHYSICIAN TO THE STAFF OF THE MEDICAL RESEARCH COUNCIL; PHYSICIAN TO UNIVERSITY COLLEGE HOSPITAL, LONDON; HONORARY CONSULTING PHYSICIAN TO THE MINISTRY OF PENSIONS.

## LECTURE II.—AURICULAR FIBRILLATION.

IN the first of these lectures I have endeavoured to put before you the chief conclusions which we are able to form respecting that rather rare condition, auricular flutter, and have stated that flutter as it occurs in man is due to a single wave circulating continuously. In this lecture I propose to deal with the much commoner, and therefore more important, disorder, auricular fibrillation. Now these two conditions are very closely related, as has been recognised for some years; they are known to be related not only because of several resemblances, but because the one not infrequently passes into the other. Thus flutter of the auricle, as I pointed out some years ago, may usually be converted into fibrillation by the administration of heavy doses of digitalis—a conversion which is made use of in the present-day therapy of flutter. We shall see presently how the two states are related, and that circus movement underlies both. To explain the inter-relation it is necessary for me to expand what I have already touched upon—namely, certain reactions of the auricular muscle to increased rate of beating. We must study in more detail the change which occurs in the length of the refractory period and in the rate at which the waves travel as the rate of beating rises.

### INFLUENCE OF HEART-RATE ON THE REFRACTORY PHASE, ETC.

The changes are somewhat complex and may be illustrated most clearly by means of the accompanying diagram (Fig. 1). To the left of the diagram is a double-headed arrow, which represents the length of the auricular cycle when the heart is beating at a normal rate. This cycle is divisible into two parts, as indicated by the two double-headed arrows which stand just to the right of the first; it is divisible into the *refractory period*, during which the auricular muscle is in the excited or contracted state, and into the *responsive period*, during which the muscle is inactive or resting. I represent the refractory period in black and the responsive period in white, and the remainder of the diagram shows, on the basis of direct observation, how these two periods are proportioned to each other as the heart-rate is raised. As the heart-rate rises by equal increments—say from 100 to 150 to 200 to 250, &c.—so the length of the cycle shortens. If the lengths of the cycles, as these shorten, are charted vertically upon a horizontal base line (as in the figure), their ends join up to form a curve, the steepness of which gradually decreases. The curve of the end of the cycle approaches the base line, at first rapidly, but gradually less rapidly. The two lines will meet at infinity. The end of the refractory period also forms a curve which moves towards the base line (it is represented by the top edge of the black portion of the figure). Briefly, the refractory period of the muscle shortens, as does the length of the contraction when the heart-rate is raised. But the refractory period does not shorten to the same extent as does the length of the cycle; consequently, the *responsive period* dwindles when the rate is advanced. It dwindles until eventually and at a very high rate of beating it disappears altogether. When this happens the muscle will not respond to every impulse reaching it; it breaks into what has been termed 2 : 1 (or half) response—that is to say, it responds only to alternate impulses entering it. That is but natural, seeing that only alternate impulses will fall during the responsive period of preceding cycles.

Now the precise manner in which this alternating response is foreshadowed in the mammalian auricle is peculiar and considerably important; it is necessary thoroughly to understand it. As the rate of beating rises and the period of responsiveness shortens a time comes when the muscle develops what is spoken of as a *partially refractory period*. It is a phase of the cycle during which the muscle as a whole *may or may not* respond to stimulation. When this partially refractory phase first develops the cycle seems to be divisible into three parts: at the beginning is the absolutely refractory phase; this is succeeded by a partially refractory phase; a short phase remains at the very end of the cycle, during which the muscle is always responsive to stimulation. But the end of the partially refractory phase is not sharply defined; it fades imperceptibly into the phase of responsiveness. If you will, the matter may be expressed somewhat differently. During the early and greater part of the cycle the muscle is quite refractory, but the end of this phase is no longer clean cut and determinate; if at one instant the muscle is wholly refractory, at the next instant it is not wholly responsive; the refractoriness fades away gradually (through the partially refractory period) and responsiveness gradually develops. The state of refractoriness is found to be denser as it is traced backwards through the cycle until at last it becomes absolute. The development of the partially refractory phase, which is a phenomenon of high rates of beating, expedites the closure of the gap between the end of the absolute refractory period and the end of the cycle. The precise instant at which the state of partial refractoriness ends is not measurable, but it is certain that, as the rate of beating advances, it soon bridges the gap completely. When this stage is reached the cycle is divisible into two—namely, a phase of absolute refractoriness and a phase of partial refractoriness; there is no true or wholly responsive phase. This state of the muscle is represented in a small diagram above the main figure.

The meaning of the change which I have described is not obscure; it is this: when the rate is sufficiently raised the muscle fibres do not all contract during each cycle; some contract in alternate cycles only, and the critical rate at which regular response fails is not the same for all the muscle fibres; some fail to respond earlier than do others. During the phase of absolute refractoriness all the fibres are refractory to stimulation; during the remainder of the cycle the fibres one after another recover their excitability, the muscle as a whole becomes more and more responsive therefore, but up to the very end of the cycle some fibres still remain refractory.

I have dealt with this question of partial refractoriness at some length, because it is essential that it be comprehended fully and clearly. It is a phenomenon which has fundamental influences upon the action of the auricle beating at very advanced rates. What I especially desire to emphasise is that, at these advanced rates of beating, each excitation wave entering the muscle finds that muscle imperfectly recovered from the passage of its predecessor.

Let us apply the small diagram in the upper part of Fig. 1 to our picture of a circulating wave. In the diagrams of the ring experiment shown in the last lecture I represented the circulating wave in its most simple form. The relations there shown between the advancing crest of the wave and its wake of retreat represent what is occasionally found in actual experiment. More usually, however, the relation in flutter is a little more complex. The gap between the crest and wake does not consist of wholly responsive but of partially refractory muscle (see Fig. 2). The onmoving crest encounters many fibres which are responsive; it finds some which are still refractory. These refractory fibres form minute barriers to its progress; it wends its way from side to side, passing only where it finds channels open and ready to receive it. It is as though a second prairie fire followed a first, but followed it at a time when the vegetation formerly burnt had not fully returned to its old condition: there would be

places where the cinders of the first fire still blackened the earth, and the second flame in passing would creep around the edge of these before it could go forward. These barriers, by deflecting it, render the onrushing wave sinuous in its course, and delay its progress from point to point.

I said in my first lecture that in flutter the rate at which the wave is transmitted is not usually normal, but that it is slower than normal. We have proof that this delay is not due to change in the rate of fibre conduction, but to small barriers of unrecovered (or refractory) fibres. This observation is one of no little consequence, since it much simplifies our conception of those factors which are responsible for the maintenance of circulating waves. These factors are three—namely, the length of the muscle path, the rate of propagation from point to point, and the duration of the effective refractory period. We now see that the second factor is controlled by the third. In large measure the length of the path is also controlled by the refractory phase; for where several channels are open to the crest of the circulating wave it will take the shortest, and that is the path along which it most closely follows its own wake. In studies of flutter, and in those of fibrillation, refractory period becomes of prime importance. Its length, and especially the length and character of its partial phase, are responsible not only for the maintenance of circulating waves, but, as we shall see, for the particular form of disordered movement which the auricle assumes.

### THE PRODUCTION OF EXPERIMENTAL FIBRILLATION.

It has been stated previously that a frequent first step towards knowledge comes when we produce, by experimenting upon animals, a condition identical with that seen in our patients. In so far as fibrillation of the auricle is concerned that step was taken 11 years ago.

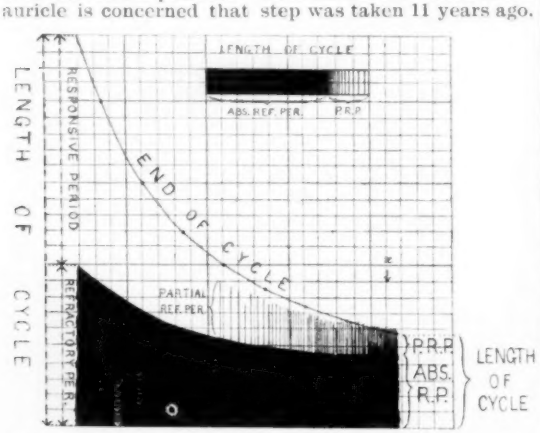



FIG. 1.—The main diagram illustrates the relation of the refractory period to the length of the cycles when the auricular rate is raised by equal increments from its normal rate to a high level. The black portion of the diagram represents the absolute refractory period, which shortens as the rate is raised (that is, reading from left to right); a curved line indicates the shortening of the cycle itself. P.R.P. = period of partial refractoriness. ABS.R.P. = period of absolute refractoriness.

At that time a condition termed fibrillation of the auricles was well known to experimenters, and a common form of disordered heart action was recognised in patients; but neither the experimental nor the clinical condition had been examined sufficiently closely to make it clear that the two states are one and the same. This identity was proved when the electrocardiograms of the experimental and clinical conditions were submitted to close comparison by Rothberger and Winterberg and myself in 1909, and when a little later I sought and obtained the opportunity of exposing to view the heart of a horse suffering from the same malady as do our patients.

Since the time of these demonstrations the term fibrillation of the auricle has come to be used universally in describing this particular disorder of the human heart. In Fig. 4 I show again electrocardiograms of the experimental and clinical conditions. Treated pictorially the curves of auricular fibrillations are, within certain limits, variable; but exactly comparable variations are to be seen in man and animal. The variability of the picture is in large part governed by the action of the ventricles. As you are aware, the rate of the ventricular action is not always the same, neither is the degree of its irregularity in different samples of fibrillation. It is not difficult to choose, from a collection of clinical curves on the one hand and experimental curves on the other

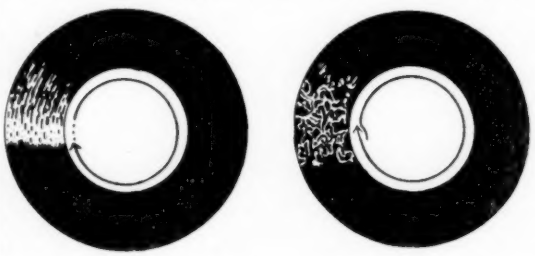



FIG. 2.—A schematic representation of the excitation wave as it circulates in flutter. The blackened portions of the ring represent those portions of the muscle which are refractory at a given instant. The crest of the wave travels constantly through muscle in a partially refractory state. The border of the advancing wave is finely serrated.

FIG. 3.—A similar representation of the excitation wave as it circulates in fibrillation. The advancing border and retreating wave are deeply crenated, and these crenations overlap. The wave is constantly advancing through small and irregular channels of responsive tissue as these open up to receive it.

hand, examples in which the resemblance is so close as to be convincing. With the details of the curves I need not now detain you, but would remind you of their most constant features. The ventricular representatives (*R* and *T*) are frequent and irregularly placed; the auricular representatives comprise a series of oscillations, of irregular form and somewhat irregular incidence and amplitude. The auricular representatives in flutter are united end to end; the action is quite regular and continuous and its mean rate is approximately 300 per minute. The auricular representatives in fibrillation are not very dissimilar to these; they are also joined end to end, and the action is again continuous. The auricular action in flutter and fibrillation differs, however, in important respects; thus, in fibrillation it is 50 per cent. faster, the oscillations having a mean rate of about 450 per minute; another difference is that in fibrillation the cycles are not accurately repeated, sometimes over short stretches of curve there may be at least a suggestion of repetition (as in the last record of Fig. 4), but close measurement will show that it is not precise; moreover, it is not long maintained. Change is the rule.

### THE NATURE OF FIBRILLATION AND ITS RELATION TO FLUTTER.

I have pointed out that the first step in this inquiry was taken 11 years ago, when it was ascertained that the clinical disorder is identical with one which can be produced experimentally; but it is to be understood that we then obtained no close insight into fibrillation *quâ* fibrillation. We had obtained knowledge of a disorder of the human heart, and, more important, the means of further investigating it. It is in respect of these further investigations that I shall now speak. The method of research has been very similar to that employed in the case of flutter. We produce fibrillation of the auricles in an animal by suitable stimulation, and proceed to examine the paths taken by the excitation waves through the muscle while this fibrillation continues. It would be impossible for me to place before you in this lecture the details of this analysis; I can only attempt to acquaint you with the chief conclusions at which we arrive after fully considering the evidence derived from all sources. The main conclusion is that fibrillation, like flutter, is maintained by a circulating wave. As in flutter, the central circulating wave is a single wave, but the circuit is completed in a shorter time; the auricular cycles, therefore, follow each other more quickly. To what is this quicker

movement due ultimately? It is almost certainly due to the path of the circus movement being somewhat shorter than is the case in flutter. Why should the path be shorter? Probably because in auricles predisposed to fibrillation the effective refractory period is shorter than in those predisposed to flutter. The crest of the circulating wave in both conditions tends to follow close upon its own wake. The refractory muscle forms a ring broken by a small gap; this broken ring, regarded as a whole, revolves. Now the length of refractory *tissue* in this ring at any given instant is obviously controlled by the duration of the refractory *period*. A decrease in the refractory period shortens the length of the tissue involved in this state at any given moment; consequently, if the gap remains unaltered the diameter of the ring must shorten. If a snake glides along the path taken by its own tail the size of the circle which it inscribes will be controlled by the length of the snake.

We believe that in fibrillation the circuit is smaller in diameter than in flutter. We cannot yet describe with confidence the precise paths which are followed, but there is some direct evidence to suggest that the mouth of the superior cava is one of the circuits which the central wave favours. Where precisely the circuit is situated is of little moment. To recognise that a single circuit exists should suffice.

The difference between fibrillation and flutter is in part one of rate; but that is not the sole difference or even the most important difference. It has been shown to be the rule that in flutter the crest of the circulating wave is constantly passing through tissue in a partially refractory state. The wave as it progresses strikes upon small barriers which render its course finely sinuous. In fibrillation this interference is much exaggerated; the barriers are larger and the crest travels along paths coarsely sinuous. Seemingly, the crest has not a straight or simply curved border of advance; it is deeply and irregularly crenated. Its wake is similarly crenated, and the crenations of the one and the other overlap and intertwine; this relation is shown diagrammatically in Fig. 3. The crest of advance moves through muscle, apparently in a denser state of partial refractoriness than is the case in flutter.

Picture the path travelled by the wave after it has circulated several times in flutter (Fig. 5). There is the track of the central re-entering wave; the path taken is finely sinuous, but apart from these very minor variations it is constant. As this mother wave circulates in the main channel it throws off centrifugal waves at each revolution, and these proceed into outlying areas of the muscle, such as the appendices and the sleeves of muscle on the cavæ; along these outlying channels the path is also finely sinuous, but in general constant. The whole muscle of the auricle is involved in each cycle. With each revolution the events are repeated; the waves are signalled with almost perfect regularity in every part of the musculature; at each revolution a wave passes to the region of the *a–v* node, the responses of the ventricle are, therefore, of an orderly character.

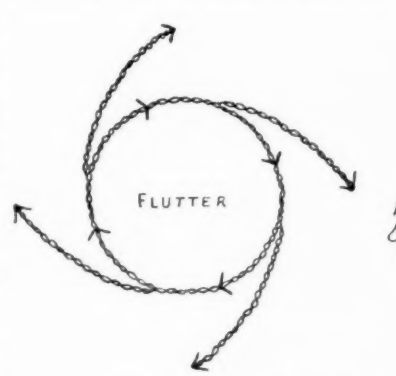



FIG. 5.—A diagram illustrating the successive paths followed by the excitation wave in flutter. The path is finely sinuous, but is in general accurately repeated from cycle to cycle.

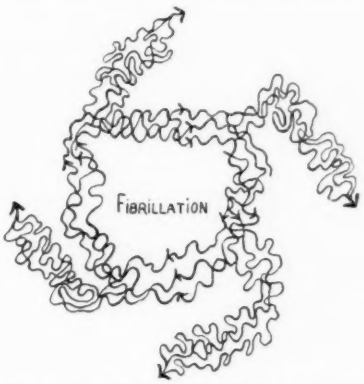



FIG. 6.—A similar diagram of the successive paths taken in fibrillation. The path is coarsely sinuous and ever-varying, though it continues to progress in a clockwise fashion around a central area.

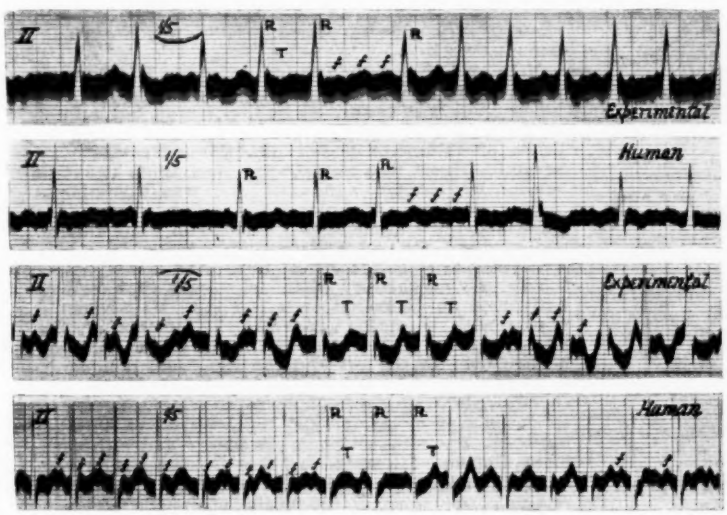



FIG. 4.—Four electrocardiograms (lead *II*) illustrating fibrillation of the auricles in man and the dog. The first and third curves are from dogs, and have been taken from recent experiments in which fibrillation of the auricles has been analysed. These two curves should be compared with the second and fourth respectively; these last are examples of clinical fibrillation. R and T are ventricular deflections; *f f* are the oscillations arising from the fibrillating auricles.

Picture similarly the path which the wave has followed after it has circulated several times in fibrillation (Fig. 6). Everywhere the track is coarsely sinuous. There are the central tracks, spread over a wider band of tissue than in flutter,[1] because the path varies. Speaking very broadly, the same central path is trodden over and over again, but in detail there is no constancy. The wave may, and apparently does, encircle the same central area repeatedly if not continuously, but it staggers along its course; it is a road of many and serious obstacles. For that reason it does not return to its starting point after constant intervals of time; for that reason and because of change in the actual path pursued, the oscillations in the electrocardiograms are of irregular incidence and form. The paths through the outlying muscle also vary. Place contacts on any region of the auricular muscle and the waves are not signalled regularly as in flutter, but irregularly; a few even fail to arrive at their proper destinations. With each irregular revolution, or at least with most, a wave passes to the region of the *a–v* node.[2] These waves arrive at the node

[1] Though the band of tissue involved in successive circuits is wider, the average circle is probably of lesser diameter, as already stated. The shorter diameter is not represented in the accompanying diagram.

[2] The waves which reach the *a–v* node are approximately one-tenth less numerous than those which flow along the central path. In the average they number, therefore, about 400 per minute in human fibrillation.

more frequently than they do in flutter, for the general movement is somewhat faster; but because the path travelled is coarsely sinuous and variable they arrive at the node irregularly. The responses of the ventricle are therefore irregular.

THE ACTUAL CIRCUITS IN FLUTTER AND FIBRILLATION.

A single circulating wave is responsible both for flutter and for fibrillation of the auricle; in both conditions it follows the re-entrant path repeatedly, though in flutter this repetition is far more exact than it is in fibrillation. We possess some definite knowledge of the actual paths followed by the wave in the fluttering auricle of the dog. The wave may encircle the mouth of the superior cava and includes a variable amount of tissue lying between this vessel and the inferior cava, or it may encircle together the mouths of both superior and inferior vena cava; it is probable, though it is not proven, that circuits are formed in some instances around the auriculo-ventricular orifices.

In man the rates in flutter are from 240 to 350 per minute; in the dog the rates are 345 to 580 per minute. In other words, the rates in the dog are approximately 50 per cent. faster. Difference in the size of the organ in man is sufficient to explain this difference of rate, if we assume the rate of transmission in the human and canine auricles to be equal. We may arrive at a general, if we cannot arrive at a precise, idea of the ring's circumference in the human subject. Thus, if the rate of a human flutter is 240 per minute, the duration of each cycle is 0·25 of a second; if the rate is 350 per minute, the duration of each cycle is 0·17 of a second. Assume that the transmission rate in flutter is 500 mm. per second, then the length of the path will be 125 mm. in the one case and 85 mm. in the other, and the diameters of the corresponding circles will be 4 and 2·7 cm. respectively. Thus, if our assumed transmission rate is correct, the circular paths in flutter are of diameters somewhat exceeding the diameters of the chief orifices of the auricle. It is these natural orifices to which we look, especially in attempting to locate the actual paths of the waves.

In human fibrillation the rate of movement is faster; it lies usually in the neighbourhood of 450 per minute, the cycle having a duration of 0·13 of a second. If we assume the same transmission rate, then the length of the path would be 66 mm., and the diameter of the circle would be a little more than 2 cm. It will be evident that if this estimate is approximately correct, and if we suppose that the chief orifices of the auricle to be those encircled by the waves in fibrillation, that in this last condition the encirclement must be a very close one. The factor which remains in doubt is, of course, the rate of transmission.

The subject of possible remedies for the state of affairs which I have described is still unripe for discussion; perhaps I have said enough in indicating what seems to me one of the chief lines which investigation should take; it is an investigation of the refractory period of heart muscle, a search for remedies which will influence the duration of this refractory state, and which, by prolonging it, will help us to close the gap between the crest and wake of the circulating wave; for this gap is essential to the maintenance of the circulating wave, whether the circulating wave is responsible for flutter or for fibrillation.

Finally, the lecturer proceeded to demonstrate shortly his recent experiments with Dr. Drury and Dr. Iliescu upon the movements of the electrical axis of the auricle in clinical flutter and fibrillation. If suitable planes are chosen it can be shown, in both these conditions, that the electrical axis changes its direction in a definite and striking manner; it revolves through 360° as each auricular cycle is completed. As the electrical axis may be taken as an index of the general direction in which the wave is travelling, these observations demonstrate that in flutter and fibrillation the wave travels in a circular fashion through the auricle. Taken in conjunction with the experimental evidence, they constitute proof of simple circus movements in the human auricle affected by these two disorders.

*Note.*—Full references to the work on flutter and fibrillation will be found in the original papers published in *Heart*, Vols. VII. and VIII.

# PERMANENT DRAINAGE OF THE ONLY KIDNEY.

BY WILLIAM HENRY BATTLE, F.R.C.S. ENG.,
CONSULTING SURGEON TO ST. THOMAS'S HOSPITAL, ETC.

IN April of last year I was asked to see again a girl of 23 years of age who had been in St. Thomas's Hospital five years previously, and for whom I had performed an operation on the kidney. When she presented herself for examination it was difficult at first to believe that the operation which was mentioned as having been performed was correctly stated. The girl was of good colour, well developed, walking with ease, and had recently completed a period of four years' work in a munition factory. Her father, who lived in South Africa, was anxious to take her back with him if it was considered she would not be any worse for living in a warm climate; he also wished to know if a silver tube which she was wearing could be dispensed with. This tube was placed in the left loin, and all the urine which she passed came away through it, being then conveyed along a rubber tube to a rubber receptacle over the left hip. No urine was passed from the bladder. Her general health was good, but she had at times "a feverish cold," with some pain in the kidney region, and then the urine was cloudy; as a rule it was quite clear. Occasionally she had a pain in the left groin, especially in damp weather. Catamenia absent.

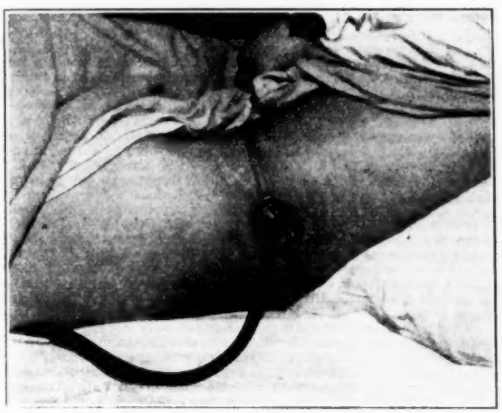
Examination showed that there was a silver tube about 1/3 in. in diameter and 4 in. long placed in the centre of a scar below the left lower ribs. This scar was that usually seen after the incision employed for nephrotomy. The skin around was healthy, dry, and without any trace of irritation. There was no leakage by the side of the tube, which was removed, cleaned, and easily replaced daily. A slight bend in the middle appeared to make the tube adapt itself exactly to the sinus in which it was placed. There was no urinous odour.

Mr. C. A. R. Nitch kindly admitted her to St. Thomas's Hospital for a few days when the photograph was taken. She was examined by the X rays, but nothing in the way of phosphatic concretion was shown in the pelvis of kidney or ureter, and the urine was quite normal. There was no ureteral opening on the right side on cystoscopic examination, nor was it possible to pass a catheter far along the left ureter. This confirmed the statement that she had only one kidney.

*Previous History.*

The previous history of the case was that she had undergone an operation at the end of 1911 for double uterus with complete septum, and retention of the menses in the closed right half. The patent half was pushed over to the left and the right half distended, forming a cystic swelling to the right and behind. The cervical canal was opened up from below, the uterus split, the septum cut out, and the two halves sutured together. She came under the care of Dr. J. S. Fairbairn in St. Thomas's Hospital in 1914. The operation had not been a success so far as the preservation of the uterus was concerned owing to the pooling of the discharges in the pouched and dilated half of the uterus and cervix. An exceedingly offensive discharge, especially at the menstrual periods, occurred, and in spite of dilatation and disinfection of the cavity of the uterus infective endometritis, followed by pelvic inflammation, necessitated a further abdominal operation—removal of uterus and tubes. An abscess was found in front of the uterus in the utero-vesical fossa and also behind the uterus. Difficulty was met with owing to the stretched condition of the cervix and lower part of the uterus, especially to the right. The softened bladder wall in the region of the abscess gave way whilst being pushed from the cervix and a vesico-vaginal fistula followed. This operation was done on Dec. 23rd, 1914. On the next day no urine was passed, but on the following day some came both from the bladder and from the abdominal wound. By Jan. 31st, 1915, she was well enough to return home, but was readmitted on Feb. 15th

complaining of pain and tenderness about the left kidney which commenced six weeks earlier. This was associated with a rise of temperature. *Bacillus coli* was present in the urine. On March 9th she had a rigor with rise of temperature to 105·6 F. I was then asked to see her and operated the same day, placing a large drainage-tube in the renal pelvis, which was much distended with purulent urine. The renal pelvis was freely opened. The tissues round the kidney were matted and the capsule adherent. It was not attempted to suture the edges of the renal pelvis to the skin. After the 23rd there was no more urine passed by urethra—all came by the loin tube—and it was evident that she had only one kidney. The urine became clear by the 23rd and the symptoms of pyelitis passed away, but there was still some pus coming from the bladder. A retro-vesical abscess was opened at a later date, and she left the hospital June 21st, 1915, still wearing the rubber tube, through which all the urine was passed. Later, a silver-flanged tube was substituted for the rubber one for regular use, and kept in position by tapes passing round the waist.



Five years after operation: No irritation of skin. Tube in left loin with flange through which supporting tape is passed.

(See figure.) This tube fits closely at a point corresponding to the lumbar fascia, but is easily taken out and replaced by the patient's mother.

*The Operation of Choice.*

This case goes far to show the superiority of the operation of nephrotresis as the one of choice when the ureter has been badly injured and the circumstances make it impossible to re-establish the channel by any method of ureteroplasty. There were only two methods available here because the injury had been at a point deeply placed in the pelvis, and the amount of cicatricial tissue about it prevented the possibility of a successful search for the lesion. If such a search had been made and by some chance the injury could have been repaired, obstruction would have ensued later from the surrounding scar tissue as it contracted. This with a condition of pyelitis affecting what proved to be the only kidney would have been fatal. In the experience of many surgeons the operation of bringing the end of a divided ureter out on the skin of the loin and fixing it there is unsatisfactory. The flow is apt to become impeded by contraction of the orifice, whilst the urinary tract above becomes infected even in clean cases, so that a state of pyonephrosis with fever develops. This sooner or later necessitates removal of the kidney when the patients have a second which is healthy. This girl had already pyelitis with early dilatation of the renal pelvis, so it was imperative that the drainage should be free from the first. In addition, it is difficult to adjust an apparatus which will act efficiently when the ureter is brought up, so as to prevent irritation of the skin with constant wetting of the patient's clothing and a very annoying urinous odour.

The operations necessitated by the congenital deformity of the uterus were difficult, and the inflamed tissues prevented recognition of the position of the ureter, which quite possibly was not in its normal place. The improvement in the girl's health which has ensued on these operations is very great, for the constant offensive discharge, with local septic inflammation, was producing a state of chronic invalidism and unhappiness.

---

RESEARCHES ON THE

# BIOCHEMISTRY OF GERMS AND OTHER PROTEINS,

WITH SPECIAL REFERENCE TO THE PROBLEMS OF IMMUNITY.

BY DAVID THOMSON, O.B.E., M.B., CH.B. EDIN., D.P.H. CAMB.,

LECTURER AND RESEARCH PATHOLOGIST, LONDON LOCK HOSPITAL; DIRECTOR OF THE BIOLOGICAL RESEARCH LABORATORY, GENATOSAN, LTD.

(*Concluded from p. 798.*)

## PART II.—PREPARATION OF DETOXICATED VACCINES.

### 1. *Preliminary Note.*

ONE is naturally led by the foregoing to conclude that a detoxicated vaccine containing all of these fractions might be better than my original vaccine, which contained only the alkali-soluble non-toxic component.

### 2. *Preparation of Detoxicated Vaccines Containing all the Antigenic and Non-toxic Portions of the Germs.*

In order to detoxicate a germ so as to prepare a vaccine which shall contain all of the antigenic and non-toxic components it is necessary to isolate each component separately by successive stages. When isolated they are mixed together in the same proportions as in the given germ itself. This mixture, emulsified in normal saline solution containing 0·5 per cent. carbolic acid to keep it sterile, is then standardised to a strength suitable for injection into the human subject.

*Stage 1. Isolation of the alkali-soluble substance.*—A mass of the given germ amounting to 5 or 10 c.cm.† of moist semi-solid material is collected in a graduated centrifuge tube; to it is added about an equal volume of N/1 NaOH (in the case of easily soluble germs) or of antiformin (in the case of germs which dissolve with difficulty). The material is thoroughly mixed with the aid of a glass rod, and is then placed in the incubator at 37·5° C. for about three hours. The mass of germs plus alkali will gradually dissolve into a more or less transparent or semi-transparent fluid. In some cases this takes place in a few minutes, in others it requires several hours; three hours is usually sufficient. With certain germs, such as staphylococci, the dissolved mass often sets into a semi-solid transparent jelly, more especially if it is allowed to stand in an ice-chest. As soon as the action of the alkali has dissolved or disintegrated the germs the mixture is filtered through a fine filter paper. When the material is syrupy or gelatinous in consistence it is necessary to mix it thoroughly with some water in order to render the filtration process more easy. The filtrate is a clear yellowish fluid, and represents the alkali-soluble fraction of the germ.

*Stage 2. Isolation of the acid-soluble substances.*—The alkali-insoluble material is now washed off the filter paper with N/1 HCl into another tube, and after thorough mixing with the acid is allowed to stand in the incubator for a few hours. This mixture is again filtered. This filtrate represents the acid-soluble fraction.

*Stage 3. Isolation of the alcohol-soluble substance.*—The material left on the filter paper is washed off with absolute alcohol, and after standing in the incubator for a few hours is filtered. This third filtrate contains the alcohol-soluble component.

*Stage 4. Isolation of the chloroform-soluble substance.*—The material left on the filter paper is washed off with chloroform placed in the incubator as before and again filtered. This filtrate represents the chloroform-soluble component.

*Precipitation of the four components from their respective solutions.*—The original germ mass has now been dissolved into four fractions, each contained in a different tube. The next step in the detoxication process consists in precipitating each fraction from its respective solution as follows:—

(1) *Precipitation of the alkali-soluble fraction.*—To the tube containing the alkali plus alkali-soluble material add N/1 HCl until precipitation begins. Now add the acid drop by drop until the maximum amount of precipitation has occurred. It is possible to add too much acid, since the precipitate sometimes tends to be soluble in excess of HCl. The tube is now centrifuged at high speed for several minutes. The amount of deposit is measured and kept, and the supernatant fluid which contains proteoses is poured off into another tube and also kept for further treatment. See below under (5).

† It is scarcely practicable to deal with quantities less than 5 c.cm

(2) *Precipitation of the acid-soluble fraction.*—To the tube containing the acid plus acid-soluble material add N/1 NaOH until the resultant fluid is definitely alkaline to litmus. A light flocculent precipitate is produced which does not tend to dissolve in excess of alkali. The tube is now centrifuged as before. The deposit is separated from the supernatant fluid, both components being kept for further treatment. (For recovery of the proteose from supernatant, see under (5).)

(3) *Precipitation of the alcohol-soluble-lipoid substance.*—To the tube containing the alcohol plus the alcohol-soluble germ substance add twice the volume of normal saline; a very fine precipitate is produced. Allow the tube to stand for one or more days until the fine precipitate flocculates into larger masses. When this has occurred filter, wash the precipitate off the filter paper with saline, and add 0·5 per cent. carbolic acid to keep it sterile.

(4) *Precipitation of the chloroform-soluble constituent.*—Place the tube containing the chloroform plus chloroform-soluble fraction in a drying oven, and when the bulk has been considerably reduced by the evaporation, add excess of absolute alcohol. The alcohol throws the chloroform-soluble material out of solution. Centrifuge and collect the deposit.

(5) *Precipitation of the proteoses.*—The supernatant fluids obtained after the precipitation of the alkali and acid-soluble fractions were kept as mentioned under (1) and (2). After bringing these fluids to a neutral reaction add twice their volume of absolute alcohol and allow to stand for about 12 hours. The proteoses separate out and can be driven down in the centrifuge.

N.B. *Toxic filtrates and supernatant fluids.*—The saline alcohol filtrate obtained in (3), the alcohol chloroform filtrate obtained in (4), and the alcoholic supernatant fluids obtained as in (5) should be kept for further examination, since they contain toxic substances, a fact which will be discussed later. For more complete detoxication the precipitates obtained as under (1), (2), (4), and (5) should be washed twice with fresh absolute alcohol, and the toxic alcohol washings kept for further investigation. The precipitate obtained as under (3) cannot be washed with alcohol, but should be washed with sterile water; by "washing" I mean that each precipitate is thoroughly mixed up with the alcohol or water and then centrifuged or filtered. This process is repeated twice.

*Collection of the non-toxic precipitates and standardisation of the vaccine.*—**The five different precipitates obtained from the original mass of germs by the above process include the alkali, acid, alcohol and chloroform-soluble substances, and also the proteoses. These wet precipitates are now collected into a graduated tube and centrifuged at about 3000 revolutions per minute for a period of two minutes, after which the total bulk is estimated. The mass of precipitate is now transferred to a small flask or bottle containing glass beads. Add 50 c.cm. of normal saline + 0·5 per cent. carbolic acid and shake very thoroughly until a fine and uniform emulsion is produced.**

I have estimated by Wright's method of counting bacteria that a mass of 1 c.cm. of semi-solid wet gonococci (centrifuged at about 3000 revolutions for two minutes) contains about 1,250,000,000,000 cocci. If this mass therefore be emulsified and made up to 125 c.cm. with saline, each cubic centimetre of the emulsion will contain 10,000 million germs. This is the normal strength to which I standardise a detoxicated vaccine—viz., 10,000 millions per cubic centimetre. It is not quite accurate to standardise a detoxicated vaccine according to the volume of wet semi-solid germs originally dealt with, since some of the material is lost during the detoxication process. For example, one might begin with 5 c.cm. of the original germ mass and end up with only 4 c.cm. of the non-toxic precipitates. In view of this fact I standardise the vaccine according to the volume of the precipitates obtained. Each cubic centimetre of precipitate is made up to 125 c.cm. with normal saline + 0·5 per cent. carbolic acid, the resulting emulsion is designated as representing 10,000 million germs per cubic centimetre. No doubt it would be more accurate to standardise the vaccines according to the weight of the dried precipitates rather than according to the bulk of the wet precipitate. The former method, however, is tedious and is impracticable in the case of autogenous vaccines, where the amount of germ substance dealt with is comparatively small.

It is hardly possible to standardise detoxicated vaccines by judging the opacity of the emulsion against a known standard, as is usually done in the case of ordinary vaccines. If this method was used very wide errors would result because the proteoses largely dissolve in the saline, forming a transparent solution. In consequence detoxicated vaccines made from germs containing a high percentage of proteose, as is found in the *B. coli*, typhoid, and dysentery group, would appear, according to the opacity test, very much weaker than those made from, say, the staphylococcus group, where the proteose content is very low.

### 3. *Investigation of Toxic By-products Obtained in Detoxication of Germs and Other Proteins.*

**The toxic by-products of the germs are to be found in the various alcoholic filtrates, supernatant fluids, and washings obtained from the precipitates in the detoxication process just described. These alcoholic fluids are usually of a light yellow or straw colour. They contain peptones, amino-acids, salts, indicators, fatty acids, &c.**

I should here mention that if a mass of minced meat or other tissue is put through the same process as just described for the detoxication of germs the same component precipitates are obtained. Moreover, the waste alcoholic filtrates and washings are toxic, yellowish in colour, and appear to be more or less similar to those obtained from the germs. Indeed, all the facts obtained in the parallel researches which I have carried out with germs, on the one hand, and with animal tissues on the other, go to prove conclusively that germ protoplasm and animal tissue are very closely allied in their physico-chemical composition.

V. C. Vaughan[18] was apparently the first to note that germs and all other protein substances, whether animal or vegetable, could be split up into a toxic and a non-toxic portion. The toxic portion, a brownish substance with a characteristic pungent odour, he found to be soluble in absolute alcohol. He believed it to be more or less identical in all proteins. When injected into animals it killed them in a manner which suggested anaphylactic shock, and he attempted to prove that this toxic substance was in all cases the cause of anaphylaxis.

*Vaughan's Method of Extracting the Poison from the Germs and Other Proteins.*

(1) The mass of bacteria or other protein is thoroughly washed with alcohol, beginning with 50 per cent. and increasing to 95 per cent.

(2) The substance is placed in large Soxhlet's flasks and extracted first for one to two days with absolute alcohol, and then for three or four days with ether. These extractions with alcohol and ether should be thorough in order to remove all traces of fats and waxes.

(3) After extraction the cellular substance is ground first in porcelain and then in agate mortars, and passed through the finest meshed sieves. This finely ground cellular substance, in the form of an impalpable powder, may be kept in wide-mouthed bottles in a dark place, and if so kept retains its toxicity for years; when exposed to light, and even if kept perfectly dry, it becomes less poisonous. Therefore, although the toxic substance is soluble in alcohol it is not extracted from the germs or protein substance even with prolonged boiling with alcohol and ether. Vaughan points out that before the poison can be extracted by the alcohol the protein must first be disrupted or split up.

(4) The poison is extracted from the bacterial or protein powder by boiling it with from 15 to 25 times its weight of absolute alcohol, in which 2 per cent. sodium hydroxide has been dissolved. After boiling for an hour on a water bath the alcohol is filtered off, and is found to contain a large amount of the poison. Three such extractions were found necessary in order to split off all the poisonous group.

(5) The non-toxic residue after extraction is dried into a fine powder. The toxic alcoholic fluid is evaporated to dryness, and the toxin thereby obtained is reduced to the form of a fine powder.

Vaughan found in the case of *B. coli* that 20 mg. of the bacillary powder, before extraction of the toxin, was the minimum lethal dose, whilst the minimum lethal dose of the non-toxic powder was as high as 300 to 400 mg. This non-poisonous residue was therefore 15 to 20 times less toxic than the actual bacillary powder before extraction. The minimum lethal dose of the powdered toxic material extracted by the alcohol varied from 8 to 60 mg. according to its state of purity. From inoculation experiments carried out on guinea-pigs and rabbits Vaughan concludes that no immunity is developed against the toxic substances extracted from *B. coli* or other germs. With repeated injections the animals developed at the most only a small degree of tolerance. Definite immunity was, however, obtained after repeated injections of large doses of the *B. coli* powder from which the toxin had been extracted. The guinea-pigs so injected acquired an active immunity, so that they could withstand at least eight times the fatal dose of the living germ.

*Comments on Vaughan's work.*—I was unaware of the existence of Vaughan's valuable researches until the end of 1919, when I read his work with great interest. My researches have confirmed and coincided with his in many points. It is interesting to note that whilst his work was directed mainly towards the toxin and the cause of anaphylaxis, mine has been directed mainly towards the antigenic values of the non-toxic components, with the desire to develop and produce more perfect vaccines and more perfect immunity.

It seems to me remarkable that Vaughan and his co-workers did not appear to realise the importance of their work in its application to vaccines and practical therapeutics. In this respect they went no further than to carry out some inoculation experiments on animals, and no therapeutic inoculation experiments on human beings were recorded. Perhaps his non-toxic bacillary residues were tested in this respect and found to fail; I do not know if this was the case. At any rate, it appears to me that his process of removing the toxin must remain unsatisfactory from the point of view of producing non-toxic vaccines, since the prolonged application of heat is injurious to the antigenic properties of the non-toxic substances. My experiments have shown that boiling at 100° C. for half an hour largely destroys the antigenic properties of the gonococcus as estimated by the complement-fixation test. For this reason my detoxication process is carried out quickly at a temperature no higher than blood heat. On the other hand, it will be noted that Vaughan's process of removing the poison entails a temperature of 78° for one to two days and a further heating for three or four days (during the preliminary alcohol and ether extractions for the removal of the fats and waxes). Finally, there is an extra heating to 78° for three hours during the actual extraction of the toxin with alcohol and alkali. This continued heating for a period of five or six days must, according to my experiments, have a very marked deteriorating effect on the antigenic properties of any antigens prepared by his process.

*Physical characteristics of the toxin.*—**According to Vaughan, the toxic substance, when more or less purified and dried into powder form, has the following characteristics:—**

(1) It is a brownish powder.

(2) It is highly hydroscopic and freely soluble in water. Any portion of the powder which did not dissolve in water was found to be non-toxic.

(3) Aqueous solutions of the poison are decidedly acid to litmus. When a few drops of mineral acid are added to this aqueous solution a precipitate is produced. Vaughan believes that this precipitate is caused by the presence of some organic acid, and he considers this organic acid to be the cause of the acidity in the aqueous solution of the poison.

(4) When the aqueous solution of the toxin is neutralised with sodium bicarbonate a brownish non-toxic precipitate is formed.

Prolonged contact with alkali lessens the activity of the poison, and even neutralisation has this effect, which is more marked the longer the preparation stands. Vaughan is inclined to attribute this to the formation of a salt through the interaction of the acid poison and the alkali. It is interesting to point out here that M. H. Gordon[16] observed that NaOH, more especially when concentrated, tended to destroy the endotoxin of the meningococcus.

(5) The toxin, according to Vaughan, is more freely soluble in alcohol than in water. Alcoholic solutions were kept for five years without recognisable loss in toxicity. It is soluble in methyl as well as in ethyl alcohol, and insoluble in ether, chloroform, and petroleum ether. Each of the latter removes a small amount of fatty substance, which is non-toxic, but they do not dissolve any appreciable quantity of the poison itself. From its alcoholic solution the poison is precipitated by ether, but contact with ether decreases its toxicity to such an extent that this method is not applicable in attempts to purify the poison.

(6) The poison diffuses slowly through collodion sacs both within the animal body and when suspended in distilled water.

(7) Vaughan considers that the poison is either a protein itself or else is mixed with one or more proteins. In aqueous solutions it gives all the protein colour reactions with the exception of Molisch's test. The Millon reaction is the most characteristic; it gives the biuret, the glyoxylic acid, and the xantho-proteic reactions, and also reacts to Liebermann's test, but does not reduce Fehling's solution. Other tests indicate the presence of sulphur in the substance.

(8) Phosphotungstic, phosphomolybdic, and picric acids all give abundant precipitates, but after much careful analysis Vaughan and his co-workers concluded that the poison was more of a protein than of an alkaloidal nature.

### *Preliminary Investigations on the Toxic Extracts by the Author.*

**My researches on the toxic extracts obtained from various germs in the detoxication process described in paragraph 2 of this part of the paper are still far from complete. In the first place, this side of my research has been retarded by the difficulty and delay in obtaining a vivisection licence for the laboratory in which I had been working. Furthermore, the actual amount of concentrated toxic material obtained from a mass of germs is very small. I have been collecting this material for nearly two years, so that only now do I possess a quantity sufficient for a thorough investigation.**

#### (1) *Method of Concentrating the Toxic Material.*

The toxic, straw-coloured, alcoholic, supernatant fluids and washings from the germ precipitates are placed in a flask and heated on an electric plate or water-bath in order to drive off the alcohol and concentrate the fluid. When all the alcohol has been boiled off the watery fluid left in the flask has a deep reddish-brown colour. This is transferred to an evaporating dish and dried in a drying chamber until only a semi-solid, moist residue remains. This residue, dark brown in colour, contains numerous crystals of NaCl, &c., and has a peculiar offensive odour. The mass, which is alkaline in reaction, is ground up thoroughly with about twice its volume of absolute alcohol, and then acidified with a few drops of concentrated HCl. The mixture is centrifugalised, and the crystalline material thereby separated from the reddish-brown solution of the toxic substance. The latter may be collected and concentrated still further by a repetition of the same process. This concentrated brownish, toxic material behaves as Vaughan has observed, being soluble in water and in alcohol and reacting to the protein tests which he has described. It is precipitated by picric acid, phosphotungstic acid, &c.

#### (2) *Presence of Indicator Substances in the Toxic Extracts.*

About two years ago I was greatly puzzled by the peculiar colour effects produced when certain germs were dissolved in alkali, and more especially in antiformin. When Friedländer's bacillus is dissolved in antiformin a deep green colour like crême de menthe is usually produced. This colour is somewhat evanescent and tends to disappear on standing, but when the germ solution is vigorously shaken up with air the colour often returns; the addition of a trace of permanganate of potash also tends to bring back the vivid green tint. Antiformin, by virtue of the chlorine it contains, is an oxidising agent, and it would appear from these facts that the green colour just described is produced by the oxidation of some protein product or by-product of the germ. Later I discovered that this colour substance was a true indicator and soluble in alcohol as well as in water. When a green alkaline solution of the Friedländer bacillus is acidified so as to throw down the meta-protein the colour changes to red and the precipitate produced has a reddish tinge. This red precipitate when treated with alcohol is more or less whitened, and the red colouring matter passes into the alcohol. The alcoholic solution of the colour material changes to green or red according as it is made alkaline or acid in reaction. This peculiar green-red indicator is apparently very unstable, since it gradually bleaches under the influence of light; moreover, if one attempts to concentrate the alcoholic solution by heating it on a water-bath the colour entirely vanishes. This green-red indicator is quite commonly found when germs are dissolved in alkali or antiformin. It occurs most often with Friedländer's bacillus, *Bacillus pyocyaneus*, Pfeiffer's influenza bacillus, various sarcinæ, and the tubercle bacillus.

A rare indicator which is amethyst or blue in colour when alkaline and apparently colourless when acid is occasionally observed during the detoxication of the gonococcus. The most common indicator appears to be of a turmeric nature, showing a brown colour when alkaline and a yellow colour when acid. This turmeric-like indicator is apparently present in all germs and in all proteins. At any rate, it has always been present in alkaline solutions of the germs and other proteins with which I have worked. I am inclined to believe that this indicator, or at any rate its parent substance, is actually present in the bacteria and in the animal and vegetable tissues, and that it is not entirely produced from the protein as a by-product due to the hydrolytic action of the alkali.

For example, if we dissolve turmeric root in alkali and then add absolute alcohol a precipitate is thrown down leaving a large amount of the turmeric indicator in the alcoholic supernatant fluid. If the precipitate is redissolved in alkali and precipitated with alcohol several times the alcoholic supernatant fluid finally becomes clear, and no more turmeric can be obtained even if the precipitate is kept in alkaline solution for several weeks. This would appear to show that a certain amount of turmeric can be obtained from the actual protein and that no more is produced by prolonged action of the alkali.

Since the turmeric and the other indicators described above are soluble in alcohol it is apparent that these colour substances will be extracted in the detoxication process of the germs, and will appear in the toxic alcoholic extracts. The green indicator is destroyed in the concentration process when boiling off the alcohol, but the turmeric material remains and is partly responsible for the brownish colour of the concentrated alcoholic solution of the toxin. From lack of vivisection facilities I do not yet know whether the actual indicator substances described above are toxic in nature or not; this point can only be tested by animal experiments. The amount of turmeric-like indicators produced from different proteins varies to a wide extent. A large quantity can be obtained from milk, and only a comparatively small quantity from meat, such as muscle or ox heart. A very large amount can be obtained from ordinary agar-agar. If agar is boiled with N/1 HCl and then excess of NaOH is added, a deep brown colour is produced which is found to be due to an indicator substance like turmeric. This substance inhibits the growth of the gonococcus. It is very soluble in acid acetone and in water.

I have stated that the reddish-brown alcoholic solutions of the toxic substance from various germs and proteins contain a turmeric-like indicator; the amount present is comparatively small, and the reddish-brown colour of the alcohol-toxic extracts is due, not so much to the presence of the indicator as to some other unknown colouring substance which does not behave like turmeric. These toxic alcoholic extracts show a reddish port colour when acid, and when alkaline the colour is more brownish, like sherry. The presence of the turmeric-like indicator is revealed by shaking up the toxic acid watery alcoholic extracts with ether, chloroform, or acetone. The ether, chloroform, and acetone in all cases become yellowish in colour, changing to brown with the addition of alkali. The bulk of the toxic extract is precipitated by the ether, chloroform, or acetone, only the turmeric fraction remaining in solution.

When the watery alcoholic toxic extracts are subjected to electrodialysis a yellow turmeric-like substance passes through the parchment to the positive pole, whilst a blackish-brown substance (not an indicator) passes to the negative pole. The yellowish material in the positive pole chamber is an indicator behaving like turmeric, whilst the blackish-brown material in the negative pole chamber does not behave as an indicator.

*The effect of hydrogen peroxide and ozone on the concentrated toxic extracts.*—When hydrogen peroxide is added to the concentrated reddish-brown toxic extract in the presence of alkali the colour is discharged and there is thrown down a white precipitate, largely amorphous but containing needle-shaped crystals, and insoluble in alcohol, alkali and water, but soluble in weak acid. A similar decolorisation and precipitation is produced when ozone is bubbled through an alkaline toxic extract. Ordinary air when passed through the toxic solution decolorises it very slowly.

*Marked resemblance between the toxic extracts and urine.*—Urine is highly toxic when injected into animals; the toxic substance in urine is soluble in water and in alcohol. When urine is evaporated down nearly to dryness a brownish material mixed with various salt crystals is obtained, which passes into solution when treated with alcohol. It resembles the concentrated alcoholic solutions of the endotoxins obtained from germs and other proteins both in colour and in smell. Like the toxic germ extracts, it contains a small quantity of a turmeric substance which passes into solution in acid acetone, ether, and chloroform, and moves to the positive pole on electro-dialysis. Like the toxic extracts from germs and other proteins, the concentrated urine solutions are decolorised by hydrogen peroxide and by ozone, producing a white precipitate containing some needle-shaped crystals. The precipitate is insoluble in alkali, alcohol, or water. The crystals are quite insoluble in water. The above similarities are very striking and are almost sufficient to justify the speculation that the alcoholic extracts obtained by the detoxication process described under paragraph 2 represent the waste toxic products of the germs and other proteins, just as the urine represents the waste toxic products produced in the tissue metabolism of the living body.

### 4. *Value of the Endotoxic Substances in the Production of Immunity.*

J. A. Kolmer[17] and H. C. Wells[19] state that the endotoxins of germs, in contra-distinction to the highly organised exotoxins, such as diphtheria and tetanus toxin, do not induce the formation of antisubstances. Vaughan's experiments led him to believe that antisubstances were not formed against the toxic extracts obtained from germs by his process. Experiments with the toxic extracts obtained from the gonococcus by my process showed that this extract did not act as an antigen when used in the complement-fixation test for gonorrhœa. One would therefore conclude that the toxic extracts are not antigenic, and that no true antisubstances, such as agglutinins, precipitins, and lysins, are produced against them.

The fact that true antisubstances are produced against the exotoxins of diphtheria and tetanus, as well as against the snake venoms, seems to have engendered the belief that such antisubstances are produced against all germ poisons. It should be remembered, however, that the "exotoxins" of diphtheria and

tetanus as well as the snake venoms are highly complex and highly organised protein substances, which are precipitable by alcohol and ammonium sulphate. Moreover, they are easily destroyed by heat. On the other hand, the endotoxic substances removed from germs by the detoxication process are not destroyed by prolonged boiling, and they are much simpler protein substances, not precipitable by alcohol or ammonium sulphate. If we bear these facts in mind it is not at all inconceivable that while the exotoxins and venoms can produce much immunity, the simpler endotoxins can produce none.

Some observers have been so greatly obsessed by the successful immunity produced against the diphtheria toxin as to maintain that the immunising power of a given germ inoculation is in direct ratio to its toxicity. They believe that any germ inoculation producing a highly toxic reaction produces more antisubstance than one wherein a less reaction results, due to low toxicity; but those who argue in this manner are obviously not well versed in these problems. They appear to forget or to be ignorant of the fact that there are other antisubstances besides antitoxins. A given bacillus or a given protein, as shown by Vaughan and myself, does not consist entirely of a mass of toxin. They consist in bulk of protein substances which are comparatively non-poisonous, and the toxin exists only in small amount. Are no antisubstances, such as agglutinins, precipitins, or lysins produced against the bulk of the foreign germ protein when injected into animals? The toxin advocates would appear to affirm that this is so, although experimental evidence is against them.

Agglutinins and lysins are well-known antisubstances produced against the bodies of germs, and I have never seen it stated anywhere that agglutinins or lysins are synonymous with antitoxins. Why, therefore, should they confuse immunity towards the exotoxins with immunity towards the bulk of the germ bodies? There is, perhaps, more reason in the argument that a given inoculation which produces a severe local and general reaction results in more immunity than one which produces only a mild effect. Yet again experience seems to disprove this belief. For example, if we inject tuberculin a very intense reaction may be produced, yet little or no perceptible formation of antisubstance occurs. On the other hand, it is well known that an extraordinary amount of antisubstance (lysin) is produced against sheep's red corpuscles when the latter are injected into a rabbit. The sheep's corpuscles are comparatively non-toxic to the rabbit and produce no great amount of reaction when injected. Quantities as great as 5 c.cm. of a semi-solid mass of the pure corpuscles can be injected intraperitoneally without killing the rabbit. The amount of hæmolytic antisubstance usually produced as a result of these inoculations is so great that the serum of the inoculated rabbit is often capable, even in a dilution of 1 to 20,000, of lysing the sheep red cells.

**The above is an example of powerful immunity produced against a substance which might be classed as almost non-toxic. Tuberculin is a thousandfold more toxic, yet I doubt if it produces 1/1000th part of the immunity produced against the sheep corpuscles. In the face of such facts there is no reason why a detoxicated vaccine should not be a superior immunising agent to the corresponding toxic vaccine. Sheep's corpuscles are hundreds of times less toxic than even detoxicated germs. I believe therefore that one ought to aim at a still more perfect detoxication of vaccines. Indeed, it seems reasonable to suppose that if it were possible to inject 5 c.cm. of solid bacterial substance a much greater immunity to the germ would be produced than with a highly toxic inoculation of an almost invisible speck of, say, 1/100 mg. of tuberculin.**

## PART III.—THE COMPOUND NATURE OF PROTEIN ANTIGENS AND A PROBABLE BIOCHEMICAL EXPLANATION OF "COLLATERAL IMMUNITY" AND NON-SPECIFIC VACCINE THERAPY.

### 1. *Existence of Non-specific Vaccine Therapy and "Collateral" Immunity.*

**It has been noticed by many observers that when a vaccine of a given germ is injected beneficial results are sometimes produced in diseases which are caused by an organism quite different from that injected. It is now well known, for example, that a curative effect is obtained in gonorrhœal rheumatism by injections of *B. typhosus* vaccine.**

Sir Almroth Wright[28] states that "all of those who have had experience with vaccines will have seen cases where therapeutic effects lying quite outside the range of the particular vaccine employed, and therefore, as we thought, not quite creditable to science, have been obtained with vaccine therapy." Later[29] he says: "I confess to having shared the conviction that immunisation was always specific. ..... Presumptive evidence of collateral immunisation began gradually to filter in our minds. ..... Hints are conveyed to us that there may exist a useful sphere of application for collateral immunisation; and that such sphere may perhaps be found in cases where the infection is of very long standing. ..... We should discard the confident dogmatic belief that immunisation must be strictly specific. ..... We should proceed on the principle instead that the best vaccine to employ will always be the vaccine which gives on trial the best immunising response against the microbe we propose to combat."

We must go even further and face other facts, since it appears to have been proved that good results have been obtained by injections of non-bacterial proteins, such as milk, proteoses, and other protein split products (J. W. Jobling and W. Peterson,[3] C. Bull,[30] Dunkling and Jobling,[22] &c.). For the explanation of this non-specific protein therapy the theory of "protein shock" has been advanced. It is believed by some that the shock produced by the injection of a foreign protein stimulates the system to produce more antibodies towards any given germ which may be attacking it. Fr. Rolly and Meltzer,[27] H. Lüdke,[25] and numerous other workers found that a temperature of 104° to 107° F. artificially produced had a favourable influence on an established microbial infection. Heated animals were more resistant to injections of bacteria, and antibodies, such as agglutinins and bacteriolytic substances, were produced more abundantly in animals which were kept over heated. It may be that the heat (temperature) causes damage to the infecting organism; it may cause a more rapid formation of antisubstance or a more rapid and firm union between the antigen and the antibody produced against it. The beneficial effect produced by non-bacterial proteins, such as milk, &c., may therefore be due simply to the temperature reactions produced, since it is usually stated that for a good effect a temperature response is required. Although it may be admitted that injections of milk, &c., can occasionally have a favourable influence on the course of a bacterial infection, and although without doubt an intravenous inoculation of typhoid vaccine has often a curative action in gonorrhœal rheumatism, nevertheless it seems to me that such modes of treatment are a step backwards in the progress of vaccine therapy. It has been proved by thousands of experiments and by thousands of observers since the times of Pasteur and Pfeiffer that a specific antibody is produced against a definite germ by inoculation with the latter. We must never lose sight of this fact. Let us grant that "protein shock" and that temperature reactions have a beneficial action in the mechanism of antibody formation; but why shock the gonorrhœal subject with typhoid vaccine or milk injections when it is just as easy to produce the shock and temperature reaction with gonococcal vaccine, and at the same time produce specific antisubstances as well?

### 2. *A Possible Biochemical Explanation of Collateral Immunity and Non-specific Vaccine Therapy.*

**It seems to me that an explanation of collateral or cross immunity can be found in the compound nature of antigens. An antigen as a general rule does not consist of one single protein substance. Professor Maurice Nicolle[26] has written as follows:—**

"Each cell and each humour represent in reality a '*mosaic of antigens*,' as first pointed out by Miss Raphael ..... Usually one of those antigens is dominant and generates an antibody equally dominant ..... Red blood corpuscles of the horse contain a dominant antigen and other secondary antigens which are also met with in the corpuscles of the ox and sheep (in which these secondary antigens are respectively the dominant ones)..... A famous antigen the Forssmann antigen, is to be found in varied cells and humours—viz., in the kidney and testicle of the guinea-pig, in the red blood corpuscles and serum of the sheep, in the kidney of the horse, and in the pneumococcus."

**In the light of the biochemical researches which I have described in Parts 1 and 2 of this paper it is easy to understand how a given bacterium or protein consists of a "mosaic of antigens" since it is composed of a combination of several different substances or fractions, and when injected it will call forth the formation of a mosaic of antibodies towards these different fractions. I have shown that the gonococcus contains 75 per cent. of alkali-soluble substance. This alkali-soluble substance is, therefore, likely to be the dominant antigen in this case. An injection of gonococci will call forth antibodies to the alkali, acid, and alcohol-soluble fractions, but the dominant antibody is likely to be that directed against the alkali soluble part.**

Although all germs contain alkali, acid, and alcohol-soluble fractions, &c., it must not be inferred that the alkali-soluble part of the gonococcus is identical, for example, with the alkali-soluble fraction of the tubercle bacillus. Recent researches by my brother, Dr. Robert Thomson, and myself have shown clearly that the alkali-soluble substance of various germs shows considerable differences, which can be demonstrated in the following manner. Let us take, for example, a solution of the alkali-soluble material from the gonococcus and the tubercle bacillus respectively. To each add a weak acid, such as N/1 HCl, until a precipitate is produced; centrifugalise and test the reaction of the supernatant fluids by means of suitable indicators.‡ In this way it is noticeable that the protein material is thrown out of solution at different points of acidity; thus some of the T.B. protein is precipitated at + 0·4 acid (Eyre's scale), whilst a second portion comes down at + 3·5 acid. With the gonococcus, on the other hand, the bulk of the protein comes down at + 3·4, + 3·5, and + 3·6 acid. Let us suppose for a moment that the proteins which are precipitated at the same hydrogen-ion concentration are similar, then it is conceivable that the tubercle bacillus and the gonococcus contain a small amount of a common protein or antigen—viz., that which precipitates at + 3·5 acid.

Again, it is found that when acid is added to milk the bulk of the casein comes down approximately at + 3·5 acid. It is, therefore, just possible that the casein is closely allied to the corresponding gonococcus protein which precipitates at the same point. If such similar proteins induce the formation of similar antibodies then the explanation of collateral immunity and the so-called "non-specific" protein therapy is simple and obvious. It appears to me that just as a crude oil is found to be a complex substance made up of several species of oil which may be separated by

‡ The reaction of protein fluids cannot be estimated by titration. Various indicators must be employed according to methods similar to those described by S. W. Cole.[21]

fractional distillation, so also the alkali-soluble and acid-soluble substances from proteins are complex, and made up of several species of proteins which may be separated by fractional precipitation.

Our researches so far appear to substantiate this belief, and if it should eventually prove to be correct then there lies open before us the possibility of preparing or compounding an antigen calculated to produce antisubstances to many pathogenic species of germs at the same time.

*References.*—8. Thomson, D.: New Culture Medium for the Gonococcus, Brit. Med. Jour., June 30th, 1917, i., p. 869. 9. Ditto: Preparation of Media for Growth of the Gonococcus, 1918, Medical Research Committee, Special Report Series, No. 19, p. 18. 10. Ditto: A New Method of Preparing Gonococcus Antigen, THE LANCET, 1918 ii., p. 42. 11. Ditto: Complement-fixation Test in Gonorrhœa, 1918, Medical Research Committee, Special Report Series, No. 19, p. 31. 12. Ditto: Detoxicated Vaccines in Treatment of Gonorrhœa, Medical Society of London, February, 1919. 13. Ditto: Detoxicated Vaccines, THE LANCET, 1919, i., p. 1102. 14. Ditto: Detoxicated Vaccines, Science Progress, 1919, vol. xiv., No. 54, p. 326. 15. Ditto: Detoxicated Vaccines, Brussels Congress; Royal Institute of Public Health, May, 1920; Jour. of State Medicine, vol. xxix., No. 3. 16. Gordon, M. H.: Brit. Med. Jour., 1918, ii., p. 335. 17. Kolmer, J. A.: Infection, Immunity, and Specific Therapy, 1917, W. B. Saunders Co., Philadelphia and London. 18. Vaughan: Protein Split Products in Relation to Immunity and Disease, 1913, Lea and Febiger, Philadelphia and New York. 19. Wells: Chemical Pathology, 1918, W. B. Saunders Co. 20. Bull, C.: Jour. Exp. Med., 1916, vol. xxiii., p. 419. 21. Cole, S. W.: Practical Physiological Chemistry, 1919, W. Heffer and Sons, Ltd., Cambridge. 22. Dunkling and Jobling: Arch. Int. Med., 1917, vol. xix., p. 1042. 23. Jobling, J. W., and Petersen, W.: Jour. Exp. Med., 1914, vol. xvi., p. 321. 24. Ditto: Ibid., 1915, vol. xxii., pp. 590, 597, 603, 141. 25. Lüdke, H.: Ergebn. d. inn. Med. u. Kinderh., 1909, vol. iv., p. 493. 26. Nicolle, M.: Jour. of State Medicine, London, 1920, vol. xxviii., No. 10., p. 293; Harben Lectures on Antigens and Antibodies. 27. Rolly, Fr., and Meltzer: Deut. Arch. f. Klin. Med., 1908, vol. xciv., p. 335. 28. Wright, Sir Almroth: Brit. Med. Jour., 1915, i., p. 625. 29. Ditto: THE LANCET, 1919, i., p. 489.

# BASAL METABOLISM AND ITS CLINICAL MEASUREMENT.

BY H. G. EARLE, M.A., M.B. CANTAB.,

PROFESSOR OF PHYSIOLOGY, UNIVERSITY OF HONG-KONG;

AND

J. STRICKLAND GOODALL, M.B., M.R.C.P. LOND., F.R.C.S., F.R.S. EDIN.,

SENIOR PHYSICIAN TO OUT-PATIENTS, NATIONAL HOSPITAL FOR DISEASES OF THE HEART, LONDON, AND LATE LECTURER ON PHYSIOLOGY, MIDDLESEX HOSPITAL, LONDON.

METABOLISM can be measured either in terms of heat production (direct calorimetry) or in terms of the respiratory exchange and quotient (indirect calorimetry). In the one case expensive apparatus, in the other much time and experience, have hitherto been necessary before reliable data are obtained, and although the clinical measurement of basal metabolism has received a good deal of attention in America its study in this country can scarcely be said to have begun. The development, however, of a portable apparatus by Benedict[1] whereby a direct measurement of oxygen absorption may be made with very little inconvenience to the patient and a great saving of time to the investigator has placed the whole subject on a different plane, and has made routine measurement a relatively simple matter.

### *The Benedict Apparatus.*

This machine consists essentially of a closed circuit containing (1) a spirometer bell, (2) an electric fan, (3) jars for soda-lime and calcium chloride.

The patient breathes into and out of this circuit through a special mouthpiece, nasal respiration being cut out by means of a nose-clip. The spirometer is filled with atmospheric air and oxygen in the proportion of 1 : 2, and this mixture, together with the expired gases, is kept circulating by the fan through the soda-lime and so back to the patient. The spirometer moves in a water jacket, rhythmically with each respiration, and generally downwards as the oxygen is absorbed by the patient and the carbon dioxide is absorbed by the soda-lime. The spirometer is accurately counterpoised by means of a weight suspended from a freely moving pulley wheel, so that there is little or no resistance experienced by the patient in breathing through the apparatus. An index attached to the weight enables a direct reading to be taken of the oxygen absorption.

The calcium chloride jars are not necessary except when it is desired to measure the carbon dioxide output by noting the increase in weight of the soda-lime. As will be pointed out later, this observation is not a very reliable one, and in routine work it is better to dispense with it.

### *Objections, Precautions, and Improvements.*

This apparatus, as well as the more elaborate "unit" apparatus which preceded it, has been somewhat severely criticised by Boothby and Sandford[2] in their recent book on the subject. Their objection can be summarised under the following headings, and though by no means valid can be used to indicate the precautions that must be taken in using this machine.

1. "Constant checking for leaks." We have now used this apparatus constantly for three months, and find that with proper precautions the danger of leakage is not a serious one. If leakage occurs it is generally due to the face-, mouth-, or nose-piece used for connexion with the patient. It is for this reason that we prefer the mouthpiece and nose-clip to the mask. It is very difficult to adjust the mask to a nervous patient so as to avoid all leakage, and we abandoned it at the outset for this reason. The mouthpiece, on the other hand, is easily inserted and can be sterilised after each experiment. It is true that most people rather object to the nose-clip, and that normal breathing becomes somewhat altered at first in depth and frequency, but, as Benedict points out, this only alters the carbon dioxide output, and does not affect the oxygen absorption which this apparatus is specially designed to measure.[3]

2. "The absorbing chemicals must be changed frequently." After all this only means one jar of granulated soda-lime, and we have found that many observations may be made without changing its contents. Moreover, much more attention must be paid to "chemicals" if a gas analysis apparatus is used. It is true that with the absorption of moisture as well as of carbon dioxide from the expired air, the soda-lime is apt to cake, with the result that there are increased resistance and diminished absorbing power. This condition is, however, soon recognised by the dyspnœa which it produces and can be remedied by the immediate substitution of a new jar in the place of the old. It may be suggested that the use of a calcium chloride jar by removing moisture will prevent "caking" of the soda-lime, but it is found that soda-lime absorbs $CO_2$ better if it is kept moist and that the risk of "caking" is the lesser of two evils. Further, it is very simple to test both the absorbing power of the soda-lime and the resistance of the apparatus, and this should be done at definite intervals so as to avoid inconvenience to the patient and inaccuracy of observations. It should also be quite easy to insert a small bottle of lime-water in the circuit between the soda-lime and the inspiratory tube, which would at once detect any deficient absorption of $CO_2$.

3. "The chief objection to the apparatus is that it cannot be cleaned and the patient is exposed to the serious danger of infection." If this is true it is a very serious objection to the use of the apparatus, and if there really is a danger to the patient the apparatus should not be used, but we fail to see why the apparatus cannot be cleaned. The mouthpiece can be sterilised by boiling after each observation and the spirometer with its connecting tubes can be readily detached and cleansed. Further, the patient does not, as stated by Boothby and Sandford, inspire "the exhalations of previous patients," since the spirometer is emptied after each observation and filled with fresh air and oxygen, while any "impurities" in the connecting pipes can be "flushed out" by the electric fan. There is no more risk to the patient in breathing through this machine than in breathing the air of our cities, and there is less risk than that involved in using the public telephone. Recent exact observations made by Dobbin and published by Roth serve to confirm the above statement.[4]

The further statement that "in the early models there is the danger of the oxygen rich mixture catching on fire," a danger which is totally impossible in the later models, rather suggests that their criticism of the

apparatus is based on prejudice rather than on experience. As already stated, it is desirable that the open-circuit method should be used as well, since fuller data can be obtained and with greater accuracy, but that is no reason why false criticism should be employed to discourage the use of a method which has a very real value.

4. Lastly it is stated "that error is introduced by failing either to start or to stop the experimental period at exactly the end of a normal respiration, a difficult thing to do with accuracy in the case of patients who breathe irregularly." This we consider is a real objection to the use of the present form of the apparatus, but we believe that it can be overcome by taking a graphic record on a kymograph, as apparently was done in the case of the larger "unit" apparatus introduced by Benedict.

We have therefore devised a kymographic attachment, using glazed paper and a pen, whereby a permanent record in ink of the whole test is obtained, as in the case of a polygraph. With the kymograph clock travelling at a known speed and a scale similar to that attached to the apparatus the oxygen absorption can be determined from the record at any point of the test. Further, valuable information is obtained of the character of the respirations in respect of depth, frequency, and regularity, and any hyperpnœa, such as might be caused by deficient carbon dioxide absorption is at once detected. An attachment like this can be made with very little additional cost, and by using glazed paper which can be kept rolled, the kymograph can be reduced in size and the inconvenience of smoking and varnishing avoided.

*Method of Making Observation.*

The patient is admitted overnight, or if this is not possible, is rested for one hour after arrival in the morning before the observation is made. No food is permitted after the previous evening—in other words, the observation is made after a 12-hours fast. The patient is gradually introduced to the test and its nature and purpose explained. The mouthpiece is first introduced, then the nose-clip, then both are used, in each case free breathing being permitted from the room atmosphere. Next the patient is connected with the apparatus, the valve being turned so that the ordinary atmosphere is still breathed. The fan is set going and the patient's eyes being closed the valve is now turned so as to connect with the spirometer and the excursions of the bell noted. As soon as regular breathing is established a reading is taken at the end of expiration and the 10-minute period started by means of a stop-watch. At the end of the period a similar reading is taken and the exact duration of the test noted—the valve is then turned back and the patient disconnected. In some cases it may be better to take two five-minute tests (e.g., with excitable patients), but in any case the readings taken can be checked and amplified by analysis of the record.

*Calculation of the Metabolic Rate.*

(1) The temperature of the spirometer and the barometric pressure are taken and the reading for the volume of oxygen used reduced to normal temperature and pressure. (2) The oxygen volume thus reduced is expressed in litres per hour, and assuming an average respiratory quotient of 0·82 the number of calories produced is determined from standard tables. (3) The surface area of the patient is obtained by means of the Du Bois curve from the height and weight and the metabolic rate is expressed as calories per hour per square metre. A reference to the standard figures for age and sex shows how much above or below normal is the rate of the patient under observation, and the basal metabolic rate (B.M.R.) is expressed as + or − per cent. of normal. Full details of the calculation, together with tables and standards, are published in a convenient form in the book by Boothby and Sandford, to which reference has already been made.

Using this method, we now have under investigation about 50 cases of thyroid and heart disease, and we shall hope later to publish results which will demonstrate the importance of these observations in the diagnosis, treatment, and prognosis of exophthalmic goitre, &c.

*References.*—1. A Portable Respiration Apparatus for Clinical Use, Benedict, Boston Med. and Surg. Jour., vol. clxxviii., p. 567, 1918. 2. Basal Metabolic Rate Determinations, Boothby and Sandford, Saunders, 1920. 3. Notes on the Use of the Portable Respiration Apparatus, Benedict, Boston Med. and Surg. Jour., vol. clxxxii., p. 243, 1920. 4. Clinical Observation with Benedict's New Portable Respiration Apparatus, Roth, Ibid., vol. clxxxiv., p. 229, 1921.

# Clinical Notes:

## MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

### A CASE OF TUBERCULOUS SALPINGITIS.

BY E. DRYBROUGH-SMITH, M.D., CH.B. EDIN.

THE following case is of sufficient interest, in view of its difficulty of diagnosis, to be recorded.

L. C., a girl of 20, was seen for the first time on Feb. 27th, 1918, when she complained of pain in the lower region of the abdomen and vomiting after meals. Her mother explained that at times patient had fits in which she tore her hair and bit herself. The illness started five years ago with pain in the abdomen and vomiting, and had continued more or less ever since, preventing her from walking and doing any kind of work. She had once been sent to hospital for operation, but was discharged without operation because, in a fit, she had bitten a nurse. She had one brother who was mentally deficient, and there was a history of tuberculosis in her father's family.

On examination patient was rather pale in general appearance, but well nourished; the abdominal pain was worse before menstruation, which was regular; the bowels acted normally. She could not stand upright, but with the body flexed and with the aid of a stick she managed to cross the room. The heart, lungs, and urine revealed no abnormalities; there were no enlarged superficial glands. Temperature was 99·4° F. and pulse 84. The abdomen moved freely, and in general appearance showed nothing abnormal. On pressure there was some tenderness over the appendicular region; on deep pressure an indefinite soft mass could be felt. Vaginal examination revealed slight tenderness in the region of the right tube; the uterus was normal in size and position and freely mobile. Nothing further was found on rectal examination. Considering the long history of pain and vomiting, the slight fever and mass felt in the abdomen, it was thought these might be due to adhesions connected with chronic appendicitis.

On March 13th, 1918, I opened the abdomen through the sheath of the right rectus. Adhesions were seen spread over the cæcum and termination of the ileum; there was no free fluid in the abdomen; the right Fallopian tube was thickened, its surface being rough, and scattered over its peritoneum were many small greyish-white tubercles; the ovary looked normal; the remaining organs and peritoneum of the pelvis appeared healthy. The appendix was abnormally thick and felt hard. On the cæcum and terminal portion of the ileum were seen a few tubercles; otherwise the intestines appeared free from disease. The right tube and ovary and the appendix were removed and the abdomen closed. The patient made a good recovery.

The pathologist's report stated: "This is a tuberculous lesion of the Fallopian tube and appendix. The tube shows adhesions of the plicæ, leucocytic infiltration, giant-cell systems, and small caseous foci. The appendix also shows masses of epithelial cells and giant cells in the lymphoid tissue; the mucous membrane appears to be destroyed, but curiously there are no tubercles on the peritoneal surface in the section. The ovary is not involved."

The patient remained well for a year; she could stand erect and walk several miles. An attack of influenza was followed by pulmonary tuberculosis from which she died in March, 1920.

*Remarks.*

In this case a definite diagnosis before operation seemed impossible. The hysterical attacks are of interest in showing the possibility of such attacks overshadowing the more serious condition. The various ways in which abdominal tuberculosis may reveal itself is very striking. In December, 1916, I operated for strangulated hernia on a stout woman of 58, whose intestine was covered with miliary tubercles; in spite of this fact she appeared to be in good health before the accident to her hernia. In 1917 I sent a girl of 21 to Dr. Edwin J. Toye, of Bideford; this patient had a large rounded mass growing up out of the pelvis, reaching nearly to the umbilicus, and Dr. Toye informed me that on opening the abdomen the appearance of this mass was carcinomatous. The abdomen was closed and the patient treated for a time in the fresh air; the mass has disappeared and the patient is living and apparently in good health.

Shebbear, N. Devon.

A CASE OF

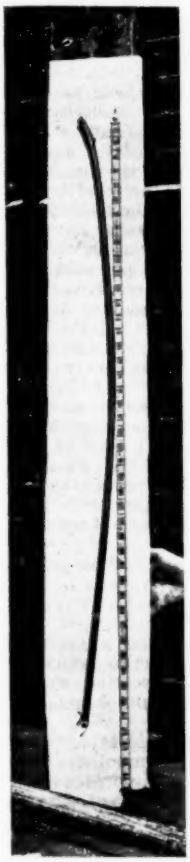
# TRANSFIXION BY STEEL ROD.

BY NORMAN C. LAKE, M.D., M.S., D.SC. LOND., F.R.C.S. ENG.,

ASSISTANT SURGEON, CHARING CROSS HOSPITAL.

THE following case is reported primarily because it is in many aspects unique, and secondarily in view of the discrepant accounts which unfortunately found their way into the lay press.

The patient, aged 24, was working at the bottom of a lift shaft on March 30th, when a steel rod, ½ in. in diameter and 5¼ ft. long, weighing 3½ lb., fell vertically from a height of 50 feet. He was four or five steps up a ladder at the time, and was bending a little forward, and the rod entered his body just behind the left shoulder. After traversing his body it made its exit at a point on the inner aspect of the right knee, and, when some 9 ft. of the rod had passed through and embedded itself in the ground below, its career was arrested. While thus transfixed the man fell sideways with the rod until its upper end rested against the side of the lift shaft. As the lower end was firmly embedded in the ground bending occurred at the point of exit from the body. At this stage between 3 and 4 ft. of the rod traversed the man's body, while about 40 ft. projected above. He supported himself by clutching at some staging, while his fellow workmen, in order to extricate him from this position, divided the rod with a hack saw about 2 in. above and below the points of entrance and exit respectively. He was then transferred to hospital still "splinted" by the remainder of the rod.



Reproduction of photograph of steel rod after removal, showing curvature resulting from its fall.

### *Condition on Admission to Hospital.*

Upon admission he was suffering from considerable shock, recovery from which was, however, rapid. The entry wound was situated behind the neck of the left scapula and was surrounded by an area of surgical emphysema. The wound of exit was immediately on the inner side of the right knee-joint, also surrounded by an area of surgical emphysema, and, of course, with two inches of the rod projecting. Except that a small portion of the rod could be felt by deep palpation below the right gluteus maximus muscle, there was little to indicate the course which it had taken. Examination of the chest revealed the presence of a left hæmo-pneumothorax. The abdomen was in a condition of absolute rigidity all over, rectal examination was negative, and the urine was normal. There were no signs of injury to nerves or to the spinal cord.

Further examination showed that the rod was very firmly embedded and that considerable force would be required for its removal. In view of the fact that so little of the rod was available externally, it was thought advisable to tap a screw thread on the lower end to enable sufficient tractive force to be applied for its removal. The patient was therefore anæsthetised by Dr. S. F. Fouracre and transferred to the X ray department, where a rapid screening showed that the rod took a somewhat curved course, convex to the right, but luckily with no angulation. It was impossible to screen in two directions owing to the fact that the man was effectually splinted by the rod. Since there was absolute abdominal rigidity, and as it was still impossible to say accurately what the condition of affairs might be inside the abdomen, a laparotomy was performed by an extensive mid-line incision. This was deemed advisable, not only on account of the rigidity, but also because it was very necessary to be prepared to deal with any eventualities which might occur during the extraction of the rod. Even with the abdomen open it was difficult to determine the exact course which it had taken.

*Course of the Rod.*—As far as could be made out after passing through the posterior aspect of the left lung, it penetrated very obliquely through the bodies of three or four vertebræ in the lower dorsal and upper lumbar regions, and as there was no leakage into the peritoneum from any viscus, it was obvious that the rigidity was due to irritation of the nerve roots in this situation. Leaving the vertebral column in the right lumbar region the rod could be felt below the pole of the right kidney and just behind the inferior vena cava. At this point it passed for about half an inch into the peritoneal cavity without causing any damage, and again became extra-peritoneal by penetrating the psoas muscle. It appeared to leave the abdominal cavity by drilling a hole through the brim of the pelvis behind the acetabulum, and having passed down the back of the thigh, guttered the internal condyle of the right femur before leaving the body.

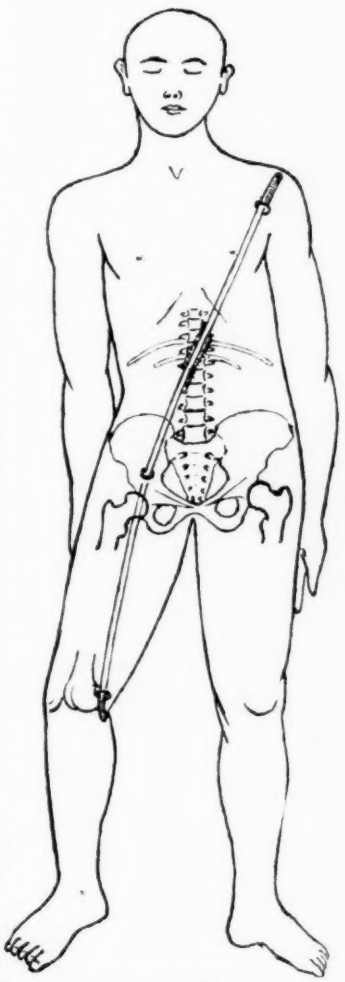


Diagram showing course taken by the rod through the man's body.

The engineer now tapped a light screw thread on the lower end of the rod, the stock being used as a convenient handle for traction. The upper end of the rod having been sterilised, traction was applied in the direction of the curvature on the rod, which was thus slowly removed while a close watch was kept for internal hæmorrhage, &c. The shock of removal was very great but yielded to appropriate treatment, and as there was no excessive bleeding the abdomen was closed without drainage, while small tubes were placed in the entrance and exit wounds.

*Sequel.*—The subsequent history is rather uneventful; the temperature remaining down and there being no signs of extensive infection. The abdominal rigidity did not clear up until the fourth day, and the hæmo-pneumothorax is still present although diminishing. Further examination of the patient since the operation has revealed no signs of any extensive nerve injury nor damage to other important structures.

The portion of rod removed is 3 ft. 6½ in. long; of this there was nearly 2 in. exposed at either end, the portion actually in the body being 3 ft. 3 in. in length and weighing 2 lb. 6 oz. The curvature of the rod must have occurred while it was in the body, and the lower end is stated to have been cut square and not in any way pointed.

# Medical Societies.

## ROYAL SOCIETY OF MEDICINE.

### SECTION OF TROPICAL DISEASES AND PARASITOLOGY.

LABORATORY DIAGNOSIS OF MALARIA.

A MEETING of this section of the Royal Society of Medicine was held on April 4th, Sir LEONARD ROGERS, the President, occupying the chair, when Dr. W. BROUGHTON-ALCOCK read a paper entitled

*Laboratory Observations on Pensioners who Contracted Malaria in the Late War.*

At the outset he emphasised the importance of collaboration between laboratory workers and clinicians and the need for research, particularly in the diagnosis of latent malaria in Europeans who had returned from tropical and subtropical endemic areas. To give an idea of the number of possible applications for a pension on account of malaria, and there were no fewer than 52,480 fresh claimants in Great Britain and Ireland as lately as last year, figures we quoted giving the number of admissions to h ,pital or malaria during the war in Mesopotamia (18,626), Salonika (161,559), Egypt (40,144) in 1916, 1917, and 1918, and East Africa (78,242) in 1917 and 1918, providing the formidable total of close on 300,000! The highest admission rates for malaria in one year were in Salonika 71,413 and in East Africa 58,236, both in 1917. His observations were based on recent work carried out at the Pensions Central Laboratory between October, 1919, and February, 1921, and were necessarily directed to the diagnosis of malaria among those who had returned from tropical and subtropical regions, including cases which could be regarded as having attained radical cure by quinine, or as suffering from latent malaria, or exhibiting recurrent attacks. A number of demobilised soldiers from the East were still claiming pensions for malaria or its results, but many showed no clinical signs of the disease, and no parasites could be found in their blood films. It was doubtful whether their condition was due to malaria or a disease simulating it. Hence arose the question of the reliability of the large mononuclear count as a guide to malarial infection, particularly in latent cases.

There was much difference of opinion as to what constituted an increase in the relative percentage of the large mononuclears, few authors stating the minimum figure. The tabulated results of the work done and observations made between October, 1919, and February, 1921, which were distributed at the meeting, showed that a total of 28,270 cases had been examined, coming from no fewer than 22 recorded areas of inspection, chiefly in the East, but including also East, West, and South Africa, England, France, and Germany. Nearly 12,000 alone of this total came from the Balkans and about 3000 from India. The laboratory work included the close search for parasites and pigment over a period of 15 minutes through both thick and thin blood films from each case, and the total and differential count of leucocytes, with particular reference to the large mononuclears. Longer than 15 minutes was devoted to the search for parasites when a large mononucleosis was found, or if the claimant showed enlargement of the spleen. The use of the thin film carefully spread was now advocated as yielding better results than the thick, and in the differential enumeration attention was directed to counting along each edge of the film and over the central portion as well. The term large mononuclear included the synonyms endothelial leucocyte, macrophage, hyaline and transitional cell, and was carefully separated in differential counting from the large lymphocyte. Out of the 28,270 cases, 777 had shown positive findings of malarial parasites, 759 being *P. vivax*, 14 *P. falciparum*, and 4 *P. malariæ*. Particulars were given under the 22 recorded areas of the number of cases found positive, including the type of parasite, on one occasion only and more than once; also of the positive findings and the period after return of the pensioner to residence in England. It was hoped to ascertain from these particulars whether cases coming from one area—e.g., Palestine—became free from parasites under quinine treatment at home earlier or later than those from another area—e.g., Salonika—but so far this had not been fully worked out. The question seemed one of considerable interest. A further table under separate headings gave the months between October, 1919, and February, 1921, and the number of blood examinations made in the central laboratory in each month, together with the total cases found positive on one occasion and more than once for each month, including the type of parasite; also the monthly number of cases found positive; it showed the tendency to clear up after 8 to 12 months' out-patient treatment. A table was also exhibited giving, out of a total of 801 most carefully detailed examinations, the number of cases presenting enlargement of the spleen (127), normal spleen (674), enlargement of the liver (52), normal liver (749), presence of anæmia (94), absence of anæmia (707), abnormal condition of heart—e.g., tachycardia, hæmic murmur, dilatation and disordered action (22), normal heart (779). The correlationship of the normal or abnormal clinical conditions of the spleen, liver, blood, and heart respectively were also included in the tabulation of the cases, together with the absence or presence of malarial parasites and the relative increase of large mononuclears (10 per cent. and over, as well as 15 per cent. and over); of lymphocytes (31 per cent. and over); and of the two types of cells combined. A second table including these 801 cases, and 18 others more recently infected, gave the classified relationship between the time from the date of the first attack of malaria (within six months, one, two, three years or over) and the recorded clinical observations with reference to the condition of the spleen, liver, and heart, and the absence or presence of anæmia, and the corresponding blood findings as to the relative increase or not of the large mononuclears, lymphocytes, and the absence or presence of malarial parasites. The percentage of cases showing the presence of malarial parasites within the various periods following the first attack of malaria was as follows:—

| | | | | |
|---|---|---|---|---|
| Within 6 months after the first attack | ... | 33·3 | per cent. |
| ,, 1 year | ,, | ,, | ... | 8·3 | ,, |
| ,, 2 years | ,, | ,, | ... | 4·5 | ,, |
| ,, 3 ,, | ,, | ,, | ... | 2·7 | ,, |

The clinical features similarly showed a marked decrease with the lapse of time and return to England, and the two gave support to the view that under rational quinine treatment at home the bulk of malarial cases cleared up in 8 to 12 months.

The conclusion to be drawn from these tables was that a relative increase of the large mononuclears was not constant in latent malaria, even in the presence of an enlarged spleen when the diagnosis of latent malaria was obvious. A further table provided details of other cases undergoing treatment which showed under or over 10 per cent., as well as under or over 15 per cent., of large mononuclears:—

(1) When no parasite was found and the duration of the period, 1 to 7 months, prior to finding of the parasite (71 cases).

| | | | | | |
|---|---|---|---|---|---|
| Large mononuclears | over | 10 | per cent. | in 28 | per cent. of cases. |
| ,, ,, | under | 10 | ,, | 72 | ,, ,, |
| ,, ,, | over | 15 | ,, | 12·5 | ,, ,, |
| ,, ,, | under | 15 | ,, | 87·5 | ,, ,, |

(2) When the parasite was found (200 cases).

| | | | | | |
|---|---|---|---|---|---|
| Large mononuclears | over | 10 | per cent. | in 59 | per cent. of cases. |
| ,, ,, | under | 10 | ,, | 41 | ,, ,, |
| ,, ,, | over | 15 | ,, | 32 | ,, ,, |
| ,, ,, | under | 15 | ,, | 68 | ,, ,, |

(3) In subsequently negative cases, from 1 to 11 months after disappearance of parasite (121 cases).

| | | | | | |
|---|---|---|---|---|---|
| Large mononuclears | over | 10 | per cent. | in 36 | per cent. of cases. |
| ,, ,, | under | 10 | ,, | 64 | ,, ,, |
| ,, ,, | over | 15 | ,, | 18 | ,, ,, |
| ,, ,, | under | 15 | ,, | 82 | ,, ,, |

(4) In cases more than once positive for malarial parasites after 1 to 12 months (53 cases).

| | | | | | |
|---|---|---|---|---|---|
| Large mononuclears | over 10 | per cent. in | 49 | per cent. of cases. | |
| ,, ,, | under 10 | ,, | 51 | ,, | ,, |
| ,, ,, | over 15 | ,, | 27 | ,, | ,, |
| ,, ,, | under 15 | ,, | 73 | ,, | ,, |

But no reliance could be placed on the figures in table (4) owing to the uncertainty of the technique applied—e.g., the use of the first drop of blood from the ear—now known to be fallacious; also the ill-defined relationship of the time of the blood film and positive findings to the period of the paroxysms; and the possible influence of quinine treatment in the leucocytolytic action, and consequent exaggeration of polymorphonuclear leucopenia, while leaving the mononuclears intact or increasing them—all factors responsible for erroneous conclusions if based on results of the differential counting of such blood films.

The conflict of views as to the relative percentages of large mononuclears in malaria and post-malarial conditions and what constituted an increase was dwelt upon as matter for discussion and clear definition, and the solution of such wide divergence of opinion was claimed to be provided by Dr. Lucey's work, showing particularly the fallacies attaching to the use of the first drop of blood taken from the ear. In the normal person the large mononuclear percentage showed a wide range, a figure as high as 10 per cent. being excessively rare. In his observations on malarial pensioners he had taken the low basis of 10 as well as 15 per cent. In taking the lower figure as a basis of mononucleosis he was influenced by the possibility of finding a constant for the large mononuclears in latent malaria, which might prove of value in the diagnosis, and so benefit the assessment of pensioners and give them opportunity for treatment. Response, too, varied in individuals, and a rise from a low figure to 10 in one person possibly signified as much as a response to 15 per cent. in another. Moreover, under the more favourable conditions associated with the soldier's return to a milder climate and better living at home, it was conceivable that in latent malaria in England the large mononucleosis was less developed and accompanied the disappearance of the parasite. Stephens and Christophers, from the examination of a large number of Europeans living in the tropics, regarded a mononuclear percentage of over 15 as evidence, now generally accepted for the tropics, of recent or existing malarial infection. This increase was most marked in the apyretic period, but was most often absent during the fever. Dr. Rieux's study, at the Val-de-Grâce Hospital, Paris, of the leucocytic formula in old malaria cases showed that the "monocytes," lymphocytes, and eosinophils returned to the normal with subsidence of the fever and disappearance of parasites from the blood; only the neutrophil figure was definitely diminished for several months, a year or even longer. Respecting the presence of parasites after the patients' return home, French authorities found that they rarely persisted after 8 to 12 months, and with this period experience in England generally agreed under the influence of rational quinine treatment. Mononucleosis was reported to last for some time after malaria in the tropics, but this was not found to be the case in observations on latent malaria at home, where, following quinine treatment and the disappearance of parasites, the relative increase in the number of large mononuclears did not persist beyond a few days. An explanation was needed to account for the differences in the duration of mononucleosis in the tropics compared with its short period after a malarial attack at home.

In cases of latent malaria at home Dr. Broughton-Alcock considered that the diagnosis and treatment should not be influenced by the absence of a relative increase of large mononuclears, when the clinical history and physical signs could be depended on. Moreover, though clinical evidence might be strengthened by a relative mononucleosis, often present between two attacks in the apyretic period, yet such increase could not be regarded as depending on or invariably associated with enlargement of the spleen, so important a clinical sign in latent malaria. Reference was made to the value to be derived from the estimation of quinine in the urine for the purpose of watching its elimination during treatment and in the detection of malingering.

Dr. H. C. LUCEY followed with a paper containing observations bearing on the reliability of the

*Large Mononuclear Leucocyte Count as an Aid to the Diagnosis of Malaria.*

The importance attaching to the diagnosis of latent malaria and conditions simulating malaria was one which could not be under-estimated in dealing with the large number of demobilised soldiers returned from the East and claiming pensions on account of reputed malarial relapses or the effects of past attacks. In the absence of clinical signs and with failure to find malarial parasites, reliance had been placed on the large mononuclear leucocyte count as an aid to correct diagnosis, the assumption being that a percentage of 12 large mononuclears, or over, should be regarded as evidence of malaria. Granted that an increase in the large mononuclears was an indication of malaria, he asked how long after an attack this increase lasted? In the event of a raised large mononuclear count, was the patient still to be regarded as suffering from malaria? What were the definition and significance of latent malaria and the blood condition associated with it? The further question as to whether the large mononuclears were ever increased in the normal person was dealt with at some length in his recorded observations. These went far to explain the fallacies which might arise by taking the blood from the ear for the differential count, particularly in the use of the first drop of blood. The results of his investigations showed that this procedure was apt to be followed by a quite erroneous picture of the state of the blood in the general circulation, notably in the case of the large mononuclears. The fallacies referred to were illustrated by a series of tables representing a large number of counts. These he had made from films taken under varying technique, from the first, second, and third drops of blood from both lobe and border of the ear, the finger pulp, below the nail-bed of the finger, and from a vein. A number of control tests were carried out on normal individuals as well as on malarial pensioners. He showed that it was possible for the first drop taken from the ear of a normal person to yield a percentage of large mononuclears as high as 30 to 40, whereas the succeeding drops, especially of the third, from the ear, and in the case of the finger the first drop of blood would yield only a normal percentage of 5 to 8 large mononuclears. This fallacious increase of large mononuclears he had found also to hold good with malarial patients when films were examined from the first drop from the ear, in which the percentage was also about 30, while succeeding drops yielded a picture of the true mononucleosis of 15–20 per cent. or more. Tables of further observations showed that when the ear was manipulated by firm handling or the application of friction previous to puncture, films from the first drop of blood gave no large mononuclear rise. Similarly, too, any measure tending to increase the rate of circulation, such as application of heat or ether to the ear, or muscular exercise, failed to produce any rise above the normal. Conversely, after ice had been applied to the ear as a consequence of the retarding of the blood flow through the capillaries, the false mononuclear rise shown by the first drop of blood previous to the application of the ice remained unaffected in the second drop.

He explained the error occasionally attaching to the use of the first drop, and to the second drop if the first was small, by the known fact that the circulation in the ear was sometimes slower than in the rest of the body. Consequently the large mononuclears tended to adhere to the walls of the blood capillaries or to collect perhaps in the lymph spaces. They therefore appeared in the first drop of blood shed in larger numbers than really existed in the general circulation, and in parts—e.g., the finger—where the circulation was brisk. For that reason the second and, preferably, the third drops

from the ear gave the truer picture of the relative numbers of leucocytes in the blood stream. His observations showed that this stagnation and accumulation were overcome either by allowing the earliest drops to escape after puncture of the ear, or by the previous application of exercises, friction, ether, &c., to increase the rate of blood flow through the ear, and so yield a reliable film. He claimed that the conflicting opinions expressed as to the relative number of large mononuclears both in malaria and other conditions, as well as in the normal state, could largely be explained by the counts derived from films taken from the ear, particularly if the first drop of blood had been used. On the other hand, blood taken from the finger, whether friction was applied or not and whichever drop was used, was always trustworthy and therefore to be preferred for both total and percental leucocyte counts. Dr. Lucey concluded by stating his opinion that "a reliable large mononuclear count, done during or within a few days after a questionable attack of malaria is an aid to diagnosis if the count is high. If it is low, it is of no help one way or the other."

*Discussion.*

Sir RONALD ROSS spoke in high appreciation of the authors' work at the Ministry of Pensions Laboratory. He regarded mononucleosis as of doubtful value in the recognition of past malaria and not to be compared in importance with the finding of parasites or pigment particles, although an increase of the total mononuclear cells was regarded as associated with both sleeping sickness and malaria, but not in his own experience.

Professor WARRINGTON YORKE confirmed Dr. Lucey's observations as to the erroneous increase of large mononuclears shown by the first drop of blood from the ear. He questioned the validity of the results obtained by two different observers, not only in counting two separate drops taken from the same person at the same time, but also in their examination of one film. It was very doubtful whether the two independent counts would be in agreement. Such lack of conformity might show a divergence of as much as 10 or 12 per cent., and be due to the varying distribution of mononuclears and polymorphs in the same film, and to one count being made in the centre, the other along the edges, the most reliable part of the film. Had, therefore, differential leucocyte counts any value at all? He personally regarded them as useless in the recognition of malaria, and the only reliable blood diagnosis was the finding of parasites, after suspending the use of quinine in the case of pensioners under treatment. He asked for a definition of latent malaria, and whether enlarged spleen taken as a sign of latent malaria implied the persistence of parasites in the body.

Professor W. J. R. SIMPSON paid tribute to the excellent work being done by Dr. Broughton-Alcock and his staff at the Pensions Central Laboratory, and was of opinion that their results would prove of the greatest value in the recognition of malaria among pensioners.

Dr. A. POWELL, from his experience in Bombay, attached considerable value to the leucocyte count, particularly under the correct technique as detailed by Dr. Lucey, in the differential diagnosis of malaria, seven-day fever, and tuberculosis. He found it difficult to provide an answer to Dr. Broughton-Alcock's question as to the value to be attached to the leucocyte count in malarial cases at home. The conditions varied much in tropical countries compared with those at home, both as to the reliability of patients' statements and as to the circumstances under which blood examinations were made. The personal equation of the counter had to be taken into consideration, and it was therefore of importance that the counts if possible should be made by one observer rather than by several.

Dr. J. GORDON THOMSON referred to the time of blood examination during the malarial attack as important. Bailey's observations, that during the paroxysm there was a leucopenia, but in the interval between the paroxysms a leucocytosis occurred due to an increase of the large mononuclears, had been confirmed by David Thomson.

Dr. H. J. B. FRY quoted from observations which had been made on 1083 cases with history of malaria. In 27, or 2·5 per cent., *P. vivax* had been found; the large mononuclear count in 10 of these was above 10 per cent. and in the remaining 17 below 10 per cent. He had not found that the mononuclear count was related either to the period of the fever, the condition of the spleen, the anæmia, or cardiac insufficiency of the malarial cases.

Dr. BASIL PRICE spoke of the diversity of views which had been expressed as to the value of the large mononuclear count, and of the importance of the fallacies as exposed by Dr. Lucey, whose observations, he felt sure, would result in a considerable revision of opinions hitherto held and a revival of interest as to the significance of the large mononuclear cells in the diagnosis of malaria.

Professor LEONARD DUDGEON quoted the results of observations carried out on malarial carriers among the British Salonika Force in the Struma Valley during the winter of 1916–1917:—

1. Total number of cases* examined, 2836.
   - Parasites present in 724.
   - No parasites present.
     - Pigmented leucocytes found in 111 cases.
     - Number of large hyaline cells over 15 per cent in 312.

* Hospital admissions from all causes.

2. Total number of cases examined, 1053.
   - Positive history of malaria, 1010
   - Two relapses or more in 471 cases.
   - Malaria parasites present in 219 cases.
   - No parasites found, but large hyalines over 15 per cent. in 399 cases.

At St. Thomas's Hospital during 1919 and 1920 there was no case in the records of the pathological department showing 15 per cent. or more of large hyaline cells, apart from malaria, and only 1 per cent. of cases with a large hyaline cell count as high as 10 per cent. He never took the first drop of blood for film examination, and recalled, as a student, that Professor C. S. Sherrington when lecturing on "The Blood" had warned them to avoid the use of the first drop owing to the fallacious increase in the large mononuclears contained in it.

Dr. A. CASTELLANI regarded mononucleosis of value as a subsidiary aid to the recognition of malaria, and from his experience in Ceylon he had found the large mononuclear increase to persist for a considerable period after an attack, but in greatly varying degree; he was unable to state to what extent this increase and variation prevailed at home as compared with the tropics.

Dr. J. B. CHRISTOPHERSON inquired whether any observations had been made as to the effect of other drugs than quinine on the leucocyte and large mononuclear counts, and what those drugs were.

The PRESIDENT asked how long mononucleosis lasted after malaria. He had found a marked increase of the large mononuclears in active malaria cases due to the benign tertian parasite, especially between the paroxysms, and, as shown by Stephens and Christophers, that increase was present after recent attacks.

Dr. ERNEST BLACK and Lieutenant-Colonel EDMUND WILKINSON, I.M.S., also spoke.

*Reply to the Discussion.*

Dr. BROUGHTON-ALCOCK, in his reply, stated that he still felt, even after the discussion, the need for the opinion of others as to the duration and degree of the large mononuclear increase among malarial pensioners at home. The use of the term latent malaria was applied to cases sent for quinine treatment, and among them enlargement of the spleen provided the most important clinical evidence of malaria. He quoted an observation made by Craig, in America, in which, out of 1267 cases showing malarial parasites 21 per cent. were cases of latent malaria. The average case usually cleared up at home and did not suffer further after a period of about 12 months. It was very difficult to apply the stoppage of quinine treatment to pensioners in the hope of finding parasites; similarly, as to

the time of blood examination, films had to be taken when possible, and no definite time could be fixed. He vainly sought for an answer as to whether the large mononucleosis found in the tropics applied to malarial cases at home, and if the explanation lay in the difference between the two climatic conditions. From his experience in England the large mononuclears, if increased, showed an intermittent rise for a period of less than seven days following a malarial attack, and he gathered that in the tropics this period was considerably extended. Was this ever found to be the case in this country? He asked for a clear definition of the hyaline cells and large mononuclears, and pointed out that Professor Dudgeon's observations in the Balkans had been carried out on persons living under active service conditions in an endemic area and exposed comparatively recently to malarial infection, a state not comparable with that prevailing among pensioners at home. In reply to Colonel Wilkinson's question as to whether any other laboratory sign than mononucleosis was to be found among malarial pensioners, he could say that no other unquestionable laboratory diagnosis existed than the finding of malarial parasites or pigment, as his tables showed. If an increase of large mononuclears was found on the edge of the film it was important to search thoroughly for parasites. He could give Dr. Christopherson no particulars as to the influence of other drugs than quinine on the leucocyte count, but quinine had a leucocytolytic action in causing leucopenia, though leaving the large mononuclears unaffected.

## SECTION OF SURGERY: SUBSECTION OF PROCTOLOGY.

### PRURITUS ANI.

A MEETING of this subsection of the Royal Society of Medicine was held on April 13th, Mr. A. E. MILES, the President, being in the chair, when Mr. J. P. LOCKHART-MUMMERY opened a discussion on this subject.

Pruritus ani, he said, was a peculiar condition in that it had only one symptom—namely, itching. It had no established pathology, and we were still in the dark as to its cause or the best method of treating it. It was by no means the trivial complaint that its name would imply. The irritation was often so intense as to drive the patient to the verge of madness. The thickening of the skin, the rugæ and eczema, fissures, and other abnormal conditions of the skin around the anal orifice frequently associated with pruritus ani were secondary results of scratching, and beyond the fact that they tended to accentuate the itching and interfere with treatment had no causal relationship to it.

Certain definite types of pruritus ani were to be distinguished: (1) those due to some general condition, such as glycosuria, &c.; (2) those due to some parasite, such as worms, pediculi, &c.; (3) pruritus obviously secondary to some lesion of the anal region, such as fissure, prolapsed pile, &c.; (4) pruritus of old standing where no local lesion can be discovered; (5) paroxysmal pruritus. A local cause for the itching was present in a great majority of cases, and the first essential was to make a thorough search for this cause. Where a definite cause for the pruritus was discovered it was generally one which produced moisture of the parts, more particularly of a septic character, such as fissure or fistula, a polypus of the rectum, or a prolapsed pile. In the case of itching of recent origin removal of the cause was followed by prompt and permanent relief. The difficult cases were those in which no local cause could be discovered, and more particularly the paroxysmal cases, where it was unusual to find any local lesion. With a history dating back for more than two years removal of any local lesion present seldom stopped the itching. It seemed reasonable to conclude that under the circumstances definite changes took place in the skin or in the nerve-endings in the skin. He believed these changes to be of the nature of a fibrosis in the deeper layers involving more especially the end-plates in the dermis and caused by the constant scratching and rubbing. In fact, in these old-standing and severe cases of pruritus an actual disease of the nerve-endings in the skin existed, as was first realised by the late Sir Charles Ball. In 1912 Dr. Dwight Murray put forward the theory that pruritus ani was due to a chronic streptococcic infection of the skin of the anal region. He pointed out that careful investigation by bacteriological methods had proved the presence of *Strept. fæcalis* infection in the vast majority of cases. Mr. Lockhart-Mummery considered that the truth of this theory was now established. In support of it was the fact that a septic lesion was the common starting-point of pruritus. We also know that chronic septic foci of the skin in other parts of the body are frequently accompanied by intense irritation. It is possible that the disease of the nerve-endings in these old-standing cases of pruritus ani is due to this infection rather than to any immediate result of the scratching. Investigation was necessary, but it was difficult to obtain portions of skin for histological purposes, and histological investigation of nerve-endings was itself difficult.

General treatment, such as dieting, non-smoking, total abstinence, &c., Mr. Lockhart-Mummery did not believe in. We ought to try to cure the condition and not to make the patient a slave to his anal region. Rigid attention to local cleanliness and dryness was very important. Lotions and powders were better than ointments. Any local cause, such as fissure, ulcer, pile, hypertrophied papilla, &c., should be removed, and it was often advisable to investigate the anal region under an anæsthetic. Dr. Dwight Murray had suggested the use of a vaccine, but it did not seem reasonable to him, Mr. Lockhart-Mummery said, to treat a septic infection of the skin by vaccine. Antiseptics, such as alcoholic solution of iodine, might be used, either painted on or applied by ionisation. Zinc ionisation or the application of nitrate of silver 30–60 g. to the ounce had given good results. X rays applied to the skin through suitable screens had cured about 20 per cent. of his bad cases. Two or three applications were usually sufficient. It was unwise to persist if marked improvement did not follow two applications.

Operative treatment remained for the cases not remedied by other means. No operation which did not destroy the diseased nerve end-plates in the dermis would remedy old-standing cases. Twenty years ago such cases were treated by excision of the anal skin or the drastic application of the actual cautery. The results were bad owing to the scarring. No such drastic measures were necessary. Sir Charles Ball described an operation for the division of the cutaneous nerves passing to the skin in the anal region. Mr. Lockhart-Mummery had performed it at St. Mark's Hospital since 1905 with excellent results. Other surgeons had condemned it. It was essential that the whole of the irritable area of skin should be rendered completely anæsthetic. The day after the operation the patient should be quite unable to feel the prick of a needle anywhere within the flaps or at the anal orifice. It was easy to miss some of the nerves, but unless they were all divided success could not be expected. In raising the flaps the skin should be undercut well above the level of the internal sphincter. This operation gave immediate relief and left no disability. Normal sensation returned completely within six weeks, generally within four. In the vast majority of cases the cure was permanent. Mr. Lockhart-Mummery had performed this operation in 59 cases; there was a slight recurrence of itching in 7 cases. Four of these were easily cured by simple application, and in 3 cases the operation was repeated with complete success. There was no serious complication, and no patient was kept in hospital or in a nursing home for more than six weeks, the average time being under three weeks. In all these cases normal sensation was restored, and there was no disability.

#### *Discussion.*

Dr. ARTHUR WHITFIELD said that, in his experience, pruritus ani was frequently caused by the oxyuris, the presence of which was seldom suspected, and he instanced the case of a lady who consulted him. He

suggested thymol, and the patient had one X ray treatment. The pruritus remained quiescent for two years, when the patient again consulted him for the same condition, the thymol treatment not having been carried out. The first dose of 30 gr. of thymol, which was now administered, expelled large numbers of thread worms. Dr. Whitfield agreed with what Mr. Lockhart-Mummery had said with regard to local applications. Grease should be avoided, but if used it should be thin and not sticky. He practically never used X rays. In his experience the first dose cured, but there was a relapse after a few weeks, which was cured by a second dose. The cure was not permanent and the time came when it was no longer safe to give further applications and the condition remained unrelieved. When there was an obvious cause which could be removed one dose of X rays produced a cure, but X rays should be avoided if possible.

Mr. J. M. H. MCLEOD said that pruritus ani was only a symptom. He had known the condition to have been caused by congestion of the liver resulting from the taking of coffee, red wines, &c., the pruritus coming on about half an hour after the ingestion of the article of diet or condiment which was at fault and lasting one to two hours. Many cases were due to cutaneous lesions. He instanced a case in which it was due to a patch of psoriasis around the anus, the other patches being trivial. He had also seen a couple of cases due to ringworm. He thought that the itching produced a thickening of the epidermis, which pressed upon nerve-endings and caused spasm and pain, a vicious circle being thus formed. Quite a number of his cases had done well with X rays. He had also used radium but was not very pleased with it.

Sir CHARTERS SYMONDS insisted upon the need for cleanliness and dryness. The application of wool would prevent friction; he preferred salicylic wool. He advocated the use of organic silver preparations, such as protargol or argyrol, in 10 per cent. to 20 per cent. solutions. They were non-greasy and should be put on after the part had been cleansed with lysol and dried thoroughly.

Mr. N. S. FINZI said that where the cause had been removed or no definite cause could be found the theory of infection of the skin was very feasible. In such cases local treatment—e.g., X rays—was a sound proceeding. The condition was always relieved by X rays to begin with, but in a large proportion of the cases the symptoms recurred. The results with radium were more permanent, he thought, than with X rays. If the irritation involved a wide area he preferred radium. He gave full doses of X rays at intervals of three weeks, and one or two doses after the irritation had disappeared. He gave radium at intervals of six weeks, and one treatment after the irritation had gone. High frequency sometimes produced a remarkable effect.

Sir CHARLES GORDON WATSON said that certain cases were medical rather than surgical. Such were those which occurred in neuropathic individuals or patients with an hereditary tendency—functional cases. He instanced the condition occurring in father and son. Surgical cases could be divided into two classes: (1) those in which there was a real cause at the anus, and (2) those in which there was no marked disease. Cure was doubtful when dermatitis was well established. While the skin remained pliable the condition did respond to ionisation. In 1909 he had treated 28 cases with zinc ionisation which was followed by much relief after the first treatment. Many patients had had 5, 6, or 7 applications. When the condition was paroxysmal some cases were functional and some, he thought, were due to hypertrophied anal papillæ. Out of 86 of his cases of pruritus ani at St. Mark's Hospital, 53 had visible papillæ. In order to determine the proportion of cases in which the papillæ were visible normally, a colleague at St. Mark's had examined a series of patients who attended the hospital, and 12 out of 50 had visible papillæ. In these cases of hypertrophied papillæ cure could be brought about by cauterisation of the papillæ.

Mr. ASLETT BALDWIN said that there was one condition which he had found in a number of cases. Examination should always be made by the sigmoidoscope for a catarrhal state of the bowel. This he treats by zinc ionisation, filling the bowel with a solution of zinc sulphate. He also uses zinc ionisation locally. He had found the local application of hazeline cream useful, and also painting with tinct. benzoini co.

Dr. I. FELDMAN agreed with the previous speaker with regard to catarrh of the bowel, and spoke of a patient who complained of continual oozing from the bowel. With regard to heredity, he told of a case in which the patient's father had also suffered from pruritus ani, and his grandmother had had pruritus vulvæ. Dr. Feldman insisted upon the need for keeping the bowels well opened.

Mr. FRANK COPE spoke of the paroxysmal nature of the complaint, in which it resembled asthma. In an American paper cases had been reported which had been subjected to skin tests and reacted to pork and potato, and the taking of or abstention from pork or potato brought on or alleviated the condition.

The PRESIDENT differentiated between pruritus due to a local condition affecting the peri-anal region and that which was part of another disease. A particular cause was dampness of the anal region due to hyperactivity of the skin in that region. He thought that hypertrophied anal papillæ were present in the majority of cases of pruritus ani. Their most productive cause was rectal constipation, where there was a collection of fæcal material where it should not exist. In the anal papillæ was a large profusion of nerve terminals, in which was situated a special rectal sense to guard against the involuntary discharge of fæces. Rectal constipation produced a muscular spasm, so that the rectum was not completely emptied. The treatment he advocated was to keep the anal region dry and to ensure the emptying of the rectum at night, which could be done by introducing half a pint of water at a temperature of 70° to 80° F. He was sure that 80 per cent. of the cases could be cured by dryness, cleanliness, relieving constipation, and removing any obvious cause. Another 10 per cent. might require other treatment, such as zinc ionisation (which was extremely good) or X rays. The remaining 10 per cent. were patients with neurotic tendencies, who would defeat all efforts and remain permanently to remind us that there was a limit to medicine and surgery.

Mr. LOCKHART-MUMMERY briefly replied.

## SOCIETY OF SUPERINTENDENTS OF TUBERCULOSIS INSTITUTIONS.

A SPECIAL meeting of this society was held at 122, Harley-street, on April 11th, when the reports, previously circulated, of several special committees were further considered.

*Report No. 4* (Diet in Tuberculosis Institutions): certain points were discussed. On the question of a special diet for hæmoptysis cases Dr. MARCUS PATERSON said he saw no necessity for altering the ordinary diet, and quoted Dr. Leonard Hill as writing that he knew of no evidence showing that lowering the diet lowers the blood pressure.—Dr. F. R. WALTERS agreed, and stated he would diminish fluids only.—There was a marked difference of opinion upon the place of milk in the diet. Most agreed it was only necessary in the case of patients markedly under-nourished. Likewise on the quantity of meat a lively discussion ensued. Drs. J. WATT and W. C. FOWLER thought 10 oz. of meat a day "as purchased from the butcher" ample; but Drs. PATERSON, T. G. PUGH, A. C. TA'BOIS, and P. W. EDWARDS disagreed and suggested it would be a better method of deciding the amount to take "cooked meat."—After further discussion the report was referred back to the subcommittee to come up again on May 30th.

*Report No. 5* (Residential Treatment of Advanced Cases of Tuberculosis) dealt with all cases unsuitable for sanatoriums and cases likely to die within one month, including the "acute early" case. Dr. NIVEN ROBERTSON thought the inclusion of the "acute early"

case bad for the moral of these cases, even if good for the more truly advanced case and for the nurses.—Dr. PATERSON said that this was overcome by the provision of small wards.—Considerable discussion ensued on the exclusion of the case likely to die within one month. Dr. PATERSON said the committee had in mind, not cases transferred from another institution, but cases sent direct from their own homes.—Drs. WATT, S. V. PEARSON, and EDWARDS thought that even such cases should be admitted both in the interests of the community and of the comfort of the patient and his friends.—There was almost unanimous opposition to small local homes; but opinion was divided about making use of certain wards in infectious hospitals, for though medical supervision might be arranged, yet the skilled nursing would be absent.—The report was referred back.

*Report No. 6* (Classification) revealed unanimity of opinion, except for minor points. The impossibility of any classification owing to the great factor of the character of the patient was pointed out. Dr. H. A. ELLIS thought that rectal temperatures or 15 minutes in the mouth were impossible for a dispensary, and that a more general, even "slacker," classification was needed for dispensaries, with a more accurate one for sanatoriums.—It was pointed out that hilus disease was not taken into account, nor yet X ray findings. To clear up a few small points the report was referred back to the joint committee with the tuberculosis group of the Society of Medical Officers of Health and the Tuberculosis Society, which is considering classification.

The next meeting was fixed for 4 P.M. on May 30th.

## SOCIETY OF MEDICAL OFFICERS OF MATERNITY AND CHILD WELFARE CENTRES.

A MEETING of this society was held on April 15th, Dr. H. C. CAMERON, the President, in the chair.

Dr. MARION COCKERELL read a paper on

*Infant Feeding after the Ninth Month.*

She emphasised the fact that babies appeared to thrive under astonishingly different diets, especially when given a plentiful supply of fresh air. Overcrowding was bad not only in itself but also because regular feeding was difficult to maintain in tenement houses and flats, where the crying child had to be pacified at night at any cost. In reviewing recent advances in our knowledge of dieting children Dr. Cockerell said that vitamin research had not given rise to any remarkable changes, since butter and cod-liver oil had always been recommended, but had warned us against the dangers of over-cooking. The importance of selecting specially digestible food for young children appeared to have been over-rated. Vegetarians fed children on salads without ill-effects; and whereas in London plums off a barrow often appeared to upset children, an indefinite quantity of plums picked direct from the tree was not, in her experience, harmful. Dr. Cockerell spoke of the importance of prophylaxis against dental caries, and quoted Dr. J. Sim Wallace's views on the need of supplying such a diet as would promote mastication, even in the very young, because of the mechanical cleansing effect of a flow of saliva and of its ptyalin content. Dr. Cockerell, after pointing out that it was unscientific to assume that the infants actually get what the doctor advises, gave details of the diet recommended by her. From the ninth to the eighteenth month she advised milk, fresh or dried, and crusts spread with butter or dripping. She saw no reason why the child should have barley jelly, or any other carbohydrate beyond what it was able to extract from biting and tearing at crusts, which it appeared to be able to masticate quite well without teeth. Madame Montessori apparently gave slops only till the children reached 5 years on the plea that the masticatory powers were still undeveloped, and it would be interesting to find out the condition of the teeth of children thus fed.

Dr. Cockerell allowed eggs at 12 months, fish at 18 months; three meals a day only, and nothing but water between meals. Milk pudding should be made stodgy, so as to require mastication, and baked suet puddings were better than boiled. A terminal apple or orange was advisable for cleansing purposes—and if these were economically impossible she advised mothers to give lettuce or other salads, or even cheese or nuts, provided the child was a good masticator. Most children were given too much sugar. Dr. Cockerell deplored the habit of giving sweets between meals, and recommended that foods should not be made sweeter than sweet fruits. During the war men missed sugar more than children did, as their palates had become used to it.

*Discussion.*

Dr. HAROLD WALLER asked what quantity of milk daily was recommended by Dr. Cockerell. An obsession as to the need of large quantities of milk appeared to swamp infant welfare centres. Milk was an ideal food for the sick child, but an enormous amount of rules had swept over from the sick-room to the centre without being questioned on the way. In Dr. Waller's opinion not more than half a pint of milk a day was advisable if the child was to thrive. An arbitrary period of nine months as a fixed point for a change of diet was not wise or practical, as the period at which a child reaches a certain stage of growth is variable. On questioning the parents of fine, healthy babies he had ascertained that parents usually discovered how best to feed them by the method of trial and error till they found what the child could take, and sometimes the baby throve excellently on a most varied diet below the age of 9 months. He himself was not at all afraid of feeding a massive child of 5 months on eggs and suet. Dr. Waller had arrived at these conclusions by choosing specially fine healthy babies and then finding out what they were fed on. Among the poor in his district cow's milk played no part in the feeding of infants, who were often gloriously healthy, and inasmuch as they lived in cellars and had but little fresh air, their well-being could only be attributed to their diet, which often resembled that of their parents. During the war the Government expressed horror that no milk was available for the poor. But the poor did not use it and there was no reason why they should. Bread fried in fat, dripping, and suet puddings supplied all the fat necessary.

Dr. ERIC PRITCHARD said that children were usually correctly fed up to 9 months, and rules were then cast aside. In his opinion the error in most diets from this age was the enormous excess of nitrogenous food offered. He gathered that Dr. Cockerell was not enamoured of "balance" in food, but he regarded this as essential. At nine months nothing happened to call for a great change except that growth was less rapid and the child moved about more—thus less nitrogenous and more carbohydrate food should be offered, but the reverse was the usual practice. As to teeth, much the most important criterion was the appearance of the teeth when erupted. Dr. Pritchard found it difficult to believe that well-formed teeth could be damaged by the presence of acids in the mouth. Dr. Wallace assumed that acid in the mouth was sufficient to cause caries, but this acid was neutralised, and the only question was whether there were sufficient alkaline reserves available for this purpose. This again depended on whether the child had passed through a modified rickety condition or not. As to milk puddings, why should they not be made into biscuits? Incidentally Dr. Pritchard had never understood why there was such a strong feeling against pastry for babies. It was composed of carbohydrates and fat, as was a milk pudding. A milk pudding in biscuit form provided excellent food and needed mastication; if given carbohydrates in the form of slops the child acquired a reflex to swallow this type of food without mastication. As to milk, Dr. Pritchard had calculated that at 9 months a pint and a quarter of milk contained all the nitrogenous food required. More led to intoxication, and should not be given. He felt sure that the milk question had been overdone.

Dr. R. C. JEWESBURY advocated the type of hard crusts recommended by Dr. Truby King, consisting of slices of bread baked in a slow oven until brick-hard. The child was given these at six months; they were not allowed to get sodden, nor was the child allowed to swallow pieces. Later on starch was introduced in the form of barley jelly. This was given because it was easily prepared, was digestible, and could be carefully graduated, the amount starting with a teaspoonful morning and evening, gradually increased. After the ninth month the milk mixture was gradually strengthened, but whole milk was not given till the eighteenth month. After the tenth month other forms of starch were given. Dr. Jewesbury inquired as to Dr. Cockerell's system of graduating the supply of carbohydrate. An objection to excessive milk feeding was its constipating effect.

The PRESIDENT suggested that all articles of diet need not require mastication any more than all need contain vitamins. A child should not be fed only on hard food; soft food need not be abandoned entirely. He did not agree with the theories propounded by Dr. Wallace. In the mouths of children with well-shaped teeth no trace of food could be seen ten minutes after soft pultaceous food had been consumed; if crevices were present, of course, bits of food were still visible. Dr. Cameron added that the important factor must surely be in the formation of the enamel organ, and in

that good development of the mouth and jaw which was dependent on correct breathing habits. The adenoid facies was produced in quite tiny infants by nasal obstruction. The importance of correct diet lay not so much in its mechanical effect emphasised by Dr. Wallace as in its suitability in building up resistance to infection. As regards milk, this food proved a convenient vehicle for giving the child fat in a palatable form. As to the vitamin question, Dr. Cameron could not believe rickets was due to lack of a vitamin; in the experimental evidence offered half the quantity of the fat given would anyhow have had to be administered to the puppies.

Dr. MARGARET ALDEN said that one advantage of milk was that the child got water that way; it was difficult to persuade mothers to give water by itself. She asked whether bacon fat could properly be recommended, inasmuch as lard had a low vitamin content.

Dr. FLORA SHEPHERD suggested that a balanced diet was important, but it was immaterial whether the child got it from milk, eggs, or in other form.

In reply, Dr. COCKERELL said that the amount of milk recommended to babies after the age of 9 months varied with the amount of crusts consumed. The maximum quantity ordered was 1½ pints, and after the age of a year not more than 1 pint was advised. As to the composition of the dietary, after 9 months she had not tried to make it approximate to that of the mother's milk. The amount of carbohydrate was left to the child's own appetite. It was not likely to overfeed if it had to work for its food.

## SOCIÉTÉ DE THÉRAPEUTIQUE DE PARIS.

AT a recent meeting of this society MM. A. MARIE and FOURCADE read a paper on

*Opotherapy and the Menopause,*

in which they remarked that every alienist knew how dangerous the menopause was in neuropathic subjects, as well as in women with renal or hepatic insufficiency. Obsessions, phobias, melancholia, acute hallucinatory confusion, and more or less systematised persecutional insanity were frequently observed in the period preceding, accompanying, or following the menopause. MM. Marie and Fourcade were convinced that the suppression of the menstrual flow was not the only cause of these symptoms, but assigned the chief rôle to a deficiency of the endocrine glands, especially of the thyro-ovarian secretion, as maintained by Hutinel. They had therefore made a systematic use of opotherapy in all the mental disorders of the menopause. After a preliminary period devoted to a disintoxication of the system, in cases where a slight hepato-renal insufficiency was present, opotherapy was instituted, consisting in all cases of thyroid and ovarian extract or extracts of other endocrine glands in the presence of symptoms indicating their insufficiency. The histories of eight cases were recorded, in six of which considerable improvement occurred, and in two no result was obtained from this treatment.

*Permanganate of Silver in the Treatment of Urinary Diseases.*

Mr. P. GALLOIS in his paper drew attention to the greater efficacy of permanganate of silver as compared with the potash salt in the treatment of urinary disease. The doses used were 0·05 g., or 0·10 g. per litre for gonorrhœa or cystitis. The only drawback of permanganate of silver was that it was slightly more caustic than permanganate of potash. The pain, however, caused by it was not very persistent, and lasted only a few minutes.

In a paper entitled

*Can the Diabetic Patient be Allowed to Grow Thin?*

Mr. P. RATHERY answers the question as follows. Loss of flesh in diabetes may be allowed, provided the patient is stout and a large eater, and the loss of flesh is confined within certain limits. He may also be allowed to lose flesh *temporarily* as the result of a relative or absolute starvation regimen. With these exceptions a diabetic patient should not be allowed to grow thin. Loss of flesh due to dietetic errors can easily be corrected. Lastly, the loss of flesh may be pathological, indicating either a more or less latent tuberculosis or some serious disturbance in the carbohydrate metabolism.

*Patent Foods and the Question of Vitamins.*

MM. ÉMILE PERROT and RAOUL LECOQ, in a paper on this subject, described their observations on white rats which had been fed on a diet entirely composed of patent foods. The changes in weight, retardation of growth, and other disturbances showed that, with rare exceptions, these so-called "complete foods" were entirely inadequate.

*The Serbian Hydromineral Station of Vrinci.*

Mr. TCHÉDA MICHAÏLOVITCH, of Belgrade, in his paper stated that Vrinci was the best known thermal station in Serbia and the neighbouring countries. It was first discovered in 1834 and gradually developed, until in 1912 it was visited by 14,000 patients. It possessed at present two springs, one hot and the other tepid, with bicarbonate of soda as the principal ingredient. The Vrinci waters were indicated generally in all affections of the mucous membranes, but the great majority of the patients were suffering from gastro-intestinal or pulmonary disease.

*The Use of Manganese in Debility.*

MM. Camescasse and Bisot drew attention to the excellent results obtained by administration of binoxide of manganese in doses of 0·03 to 0·07 g. daily in children whose growth was retarded, as well as in chlorosis in girls and hæmophilia in boys. The treatment lasted three months, the drug being given for 12 days at a time.

*The Treatment of Tachycardiac Neuroses by Hydrotherapy.*

Mr. R. DUBOIS recorded three cases, two of which presented Continuous Tachycardia and one Paroxysmal Tachycardia, which were much improved by hydrotherapy. The method employed was as follows: During the first three days a tepid douche of a temperature 98·6° F. was given for one minute. The following three days the douche was followed by a cold affusion at 53·6° F. for 10 seconds. After the seventh day the cold douches were given for 25 seconds. Examination of the patient's pulse before and after the douche showed that there was often a difference of 30 or 40 beats. The sedative action of the cold douche which was temporary at first gradually became persistent, and the tachycardia disappeared. At the same time there was a slight fall in the blood pressure, which was always somewhat raised in these patients.

## LONDON ASSOCIATION OF THE MEDICAL WOMEN'S FEDERATION.

A MEETING of this association was held on April 12th at the Elizabeth Garrett Anderson Hospital. In the absence of Mrs. FLEMMING, the President, the chair was taken by Lady BARRETT.

Dr. JANE WALKER read a paper on

*Tuberculosis in Children of School Age,*

basing her observations chiefly on her experience at the East Anglian Children's Sanatorium. She pointed out that the importance of the question of tuberculosis in children had become recognised, largely as a sequel to the establishment of a school medical service. Most people agreed that tuberculosis is usually acquired in childhood, though its exact prevalence is still quite unknown, the percentage of incidence given by different competent authorities varying from 2 in 300 to 15 per cent. The disease in children was usually insidious in onset, though very rarely the onset might be sudden, with hæmoptysis or pleurisy. Dr. Walker's statistics showed that out of 800 children treated at the East Anglian Sanatorium 1·5 per cent. gave a history of hæmoptysis at onset, 20 per cent. a history of cough, and a small number dated the illness from an attack of whooping-cough, still fewer from measles. The duration of symptoms before treatment was sought varied from five years to one. Differential diagnosis had to be made between tubercle, rheumatism, and chronic gastro-intestinal catarrh. Rheumatic cases did not respond to treatment, while cases with intestinal disturbance are proved able to digest fats only with difficulty. Statistics taken at King Edward VII. Sanatorium showed that the fact that a child came from a home where there was definite tuberculous disease did not apparently make its prospects worse. Infection by contact appeared to be a far more important factor than infection due to hereditary predisposition, but it was often difficult to find the source of infection. The presence of T.B. in the sputum was of vital significance; where they occurred in children the seriousness of the case was enormously increased. From 1914 to 1919 at the East Anglian Sanatorium, 62 per cent. of the 807 children had T.B. in the sputum, and of these 56·4 per cent. died. Results of treatment in cases where T.B. did not occur in sputum were very good. 85 per cent. were sent home really well, and only quite a small percentage of these needed further treatment. As for diagnosis in early stages, this was very difficult by physical examination of the chest alone. Dr. Walker pointed out the importance of training the medical profession in the recognition of early signs of the disease, and suggested that a linking of hospitals and tuberculosis dispensaries would be of much value to this end.—A discussion followed, in which Dr. Rose Jordan, Dr. C. A. King, Mrs. Hogarth, Dr. Flora Shepherd, Dr. Mary Gordon, and Dr. A. Parsons, joined.

# Reviews and Notices of Books.

DIABETES.

1. *Le Diabète Sucré. Etudes Cliniques, Physiologiques et Thérapeutiques.* By Professor MARCEL LABBÉ. Paris: Masson et Cie. 1920. Pp. 376. Fr.20.
2. *Diabetes.* A Handbook for Physicians and their Patients. By PHILIP HOROWITZ, M.D. New York: Paul B. Hoeber. 1920. $2.

1. This book is mainly composed of clinical lectures and papers which have been published in various French journals. With one exception they all appeared before 1915, and as our knowledge of diabetes has increased considerably since that time it is inevitable that some of them should be out of date. The method of publishing collected papers in book form suffers from the drawback that it involves much repetition. No less than three chapters are devoted to the treatment of coma by alkalies. The author divides cases of diabetes into two classes, those without and those with loss of weight. He describes the symptoms of both these types as illustrated by cases and their treatment. Treatment consisted in reduction of carbohydrates, but the need of a high protein diet is emphasised for the cases with loss of weight. Treatment by starvation is described as a possibility, but is not recommended except for fat patients. Allen's work is barely mentioned and the author has no appreciation of its value. While the early diagnosis of coma is considered at some length, no allusion is made to the importance of estimating the percentage of carbon dioxide in the alveolar air. Coma was treated with massive doses of alkalies, but starvation was not employed to avert its onset. The book contains some articles which are of special interest. Chapter XIII. consists of a clinical lecture on bronzed diabetes, and gives a good account of its pathology. Chapter XVI. is an interesting record of a patient who developed glycosuria about 20 years after the onset of the symptoms of acromegaly.

2. Dr. Philip Horowitz's book is designed to bring about intelligent coöperation between the doctor and the patient. It is not intended to supplant the doctor, but to teach the patient a little about the disease and a great deal about diets. The treatment advocated is the modern one of Allen and Joslin, an adequate account of which is given. Accounts of cases are given, and as the book is intended for patients the mild ones are fully described, while the severer ones are barely touched on. Instruction about diet is very full, but the recipes lose a little of their value for English readers, as the patent preparations are all American. A good table of the protein, fat, sugar, and calorie contents of foods is provided. The patient is urged to test his own urine. Benedict's reagent is recommended for sugar and the ferric chloride test for aceto-acetic acid, but the common error is made of saying that the nitro-prusside reagent is a test for acetone, whereas it is a much better test for aceto-acetic acid.

---

TRIAL OF THURTELL AND HUNT.

Edited by ERIC R. WATSON, LL.B., of the Inner Temple, Barrister-at-law. Notable Trials Series. London and Edinburgh: William Hodge and Co., Ltd. 1921. Pp. 217. 10*s.* 6*d.*

THE murder of William Weare by John Thurtell near Elstree on Oct. 24th, 1823, ranks as a classic, because after having excited a prodigious amount of public interest as a blood-curdling crime it found its way into literature. Carlyle[1] and George Eliot both refer to the attribution of respectability to a man who kept a gig, apparently put in the mouth of a witness by the *Quarterly Review*, as Mr. Watson finds no authority for it in the reported evidence; Borrow and Pierce Egan were familiar with the murderer's career; Lytton, in "Pelham," drew inspiration from this crime. It was, however, nothing more than a brutal act of butchery, committed for the joint objects of revenge and gain, and the crime was promptly brought home to its perpetrator owing to his own recklessness and stupidity. He could have, and in fact did, kill his victim single-handed, but he took two fellow ruffians, Hunt and Probert, into his confidence, of whom the latter (hanged in the following year for a horse-theft) was called as King's evidence, and the former was tried with Thurtell, convicted as accessory, and transported. He too had hoped to be made a witness, and he did all he could to save his own neck and hang his principal by showing where the body had been hidden. The murder of Weare, a person deserving no particular sympathy, is justifiably included in the "Notable Trials Series" on account of the features above mentioned, not on account of any legal, scientific, or romantic interest attaching to it, or any display of astuteness by the authorities in its detection. Mr. Eric Watson, who has edited the story of the trial, has been at considerable pains to render the volume for which he is responsible authoritative, and, in the interests of strict accuracy, the editor of the Dictionary of National Biography might take advantage of his research if ever the volume containing the name of Thurtell comes up for revision. Mr. Watson is not, however, always to be congratulated upon his style, which has a tendency towards the conventions of Victorian journalism. For example, when he wishes to record that the Thurtells kept a public-house, he tells us that "the brothers decided to tempt fortune in the *métier* of Boniface."

The medical evidence at the trial was of the simple character to be expected.

> "His throat they cut from ear to ear
> His brains they punchèd in,
> His name was Mr. William Weare,
> Wot lived in Lyon's Inn."

That is Mr. Watson's version of the well-known ballad, and the first two lines quoted indicate roughly the injuries deposed to by Mr. Thomas Ward, surgeon, of Watford. He bore out Probert's report of the murderer's own account of how he had fired his pocket pistol without effect, had cut his victim's throat, aiming at the jugular vein, and then "jammed the pistol into his head," fracturing his skull by driving the muzzle into it with repeated blows. It is satisfactory, however, to note that Mr. Justice Park, in summing up, said that Mr. Ward had given his evidence "in a manner highly creditable to him as a professional man and a gentleman."

The maps included by Mr. Watson will enable any good walker or curious motorist from London to visit the scene of the murder. He will not find Probert's cottage, any more than he will find Lyon's Inn in the Strand between Holywell-street and Wych-street, for the cottage, we believe, was pulled down about thirty years ago. He may, however, be able to trace the garden where the body was at first hidden in a pond, and he should be able to identify with tolerable exactness the spot where Weare was killed. In doing so he will tread in the footsteps of Sir Walter Scott, who made the same pilgrimage nearly a hundred years ago.

[1] Carlyle: Miscellanies, vol. ii., p. 144. According to Carlyle's note the witness was speaking of Weare, but Probert also owned a gig, and Thurtell hired one for the purpose of the murder.

---

MONOGRAPH ON INDUSTRIAL CHEMISTRY.

*Plantation Rubber and the Testing of Rubber.* By G. STAFFORD WHITLY, Ph.D. London: Longmans, Green, and Co. 1920. Pp. 559. 28*s.*

THE development of the automobile is largely responsible for the enormous expansion which the rubber industry has undergone during the last ten years. The world's output of raw rubber was, in 1917, more than three and a half times that of 1910, this increased production having been absorbed chiefly by the United States. Whereas rubber used to be obtained from inaccessible forests, it is now for the most part derived from the plantations, where its preparation can be carried out under proper technical control, and new and far-reaching possibilities are thus opened up for the industry.

In Part I. of this volume Dr. Whitly describes the preparation of plantation rubber from the tree stage to the finished product. The subjects are dealt with in a clear and fairly detailed manner and with numerous references to the scientific and technical literature. This portion of the work should be read by those who are financially interested in rubber. Part II. is concerned with investigations relating to the physical properties of rubber, such as the modulus of elasticity, the technique of tensile and of vulcanisation tests, viscosity determinations, the relation of the thermal, optical, and electrical to the mechanical behaviour of rubber, and so forth.

The work is well written and freely illustrated, and may be recommended confidently to those who are associated in any way with this great and increasingly important industry.

---

MANUAL OF NURSING PROCEDURE.

By AMY E. POPE. London and New York: G. F. Putnam's Sons. 1921. Pp. 596. 18*s.* 6*d.*

As announced in the preface of this useful book, it has been prepared especially to facilitate teaching by demonstration of such practical nursing as is usually included in the first year of instruction, and it can be highly recommended to ward sisters and sister tutors. It should be a valuable aid in the correlation of theory and practice since the author has included with each demonstration its physiological basis where knowledge of this is essential to the intelligent carrying out of prescribed treatment. To appreciate the psychology of nursing is as important to the student as acquiring a vast knowledge of physiological facts and nursing procedure, and the author has realised this in a valuable chapter on some of "The Routine Procedures Incidental to the Comfort and Care of Patients." The instructions given in this chapter embody the very essence of good nursing, founded on a sympathetic understanding of the mind of the patient, and the formation of good nursing "habits."

Although the book can be highly recommended to instructors and nurses alike, we may remark that the addition of more illustrations would have increased its value, and at the same time obviated the need of verbal explanations not always very clear.

---

AMERICAN YEAR BOOK OF ANÆSTHESIA AND ANALGESIA (1917–18).

Edited by F. H. MCMECHAN, A.M., M.D. New York: Surgical Publishing Company. Pp. 483.

THIS annual publication has suffered delay owing to the war, but a great part of its contents owe their value to the same cause. A large number of contributions describe the practice of anæsthetics at military hospitals near the line and at the base, and enumerate the lessons taught to the anæsthetist by military surgery. Several of these papers have already appeared in English journals. Of the other articles, some deal with circulatory disturbances under anæsthesia, with pharmacology and physiology of general anæsthetics, with blood changes, and with special methods of anæsthesia. W. E. Muns contributes a paper on the effects of ether anæsthesia and visceral trauma as shown by vasomotor and blood-pressure changes. The experiments show how, by two different routes, the one being continued stimulation and the other prolonged depression, the end-result is the same—functional incapacity—whether brought about by excessive trauma or by anæsthetic over-dose. A paper on blood-pressure guides during operations shows how the sphygmomanometer may indicate the beginning of shock before this can be discerned by alteration in the pulse-rate, and also how asphyxial changes may be signalled by blood-pressure alteration before they are obvious to the naked eye. The readings were taken at least every five minutes. Pre-operative blood-pressure tests have been used by G. W. Roots to formulate a rule for operative risks. Similarly, McKesson states a rule for measuring the severity of shock during operation. J. O. Poliak discusses pulse pressure as the pre-operative index of cardiac strength. A paper on Warmed and Unwarmed Ether Vapour contains the statement that there is no satisfactory theoretical or experimental evidence that anæsthetic vapours are made less toxic by being warmed. The volume is a valuable one, but not quite the equal of its predecessor.

---

OUR SOCIAL HERITAGE.

By GRAHAM WALLAS. London: George Allen and Unwin, Ltd. 1921. Pp. 292. 12*s.* 6*d.*

THE human race owes its present existence to nature and nurture, the latter consisting of two parts, one acquired by each individual for himself, the other consisting of knowledge, expedients, and habits handed down from one generation to another by the social process of teaching and learning. It is the latter which forms the subject of Professor Wallas's entertaining book. From the social heritage in work and thought the author passes on through group and national coöperation to a consideration of professionalism and liberty, and, finally, after envisaging world coöperation, to our present conceptions of constitutional monarchy, science, and the church. His views on the medical profession betray no close acquaintance with the subject.

Professor Wallas thinks very meanly of the ability of nature and the individual part of nurture to fit the race for existence. Were every human being now alive to lose all the knowledge and habits acquired from preceding generations, while retaining unchanged his own powers of invention, memory, and habituation, nine-tenths of the inhabitants of London would, he says, be dead in a month, and 99 per cent. of the remainder within six months. They would have no language to express their thoughts, and no thoughts but vague reverie.

> "They would wander about, led by the inarticulate cries of a few naturally dominant individuals, drowning themselves, as thirst came on, in hundreds at the riverside landing places, looting those shops where the smell of decaying food attracted them, and perhaps at the end stumbling on the expedient of cannibalism."

It will be seen from this quotation that Professor Wallas is an advanced disciple of Weismann, and also, as we suggested above, that his book is very entertaining. This applies equally whether he is writing of public school education, of the Mesopotamian inquiry, or of sacramental emotion. And whether the reader agrees with his conclusions or not he cannot escape from the cogency of the author's arguments, by which he will be led gently on from step to step until he may need to call to his aid some hereditary prejudice in order not to have his whole aspect of the external world turned inside out. But here Professor Wallas offers no help, for he does not admit the existence of hereditary prejudice.

---

A PRACTITIONER'S VADE-MECUM.

*Therapeutische Technik für die ärztliche Praxis.* Ein Handbuch für Ärzte und Studierende. Fifth edition. By many Authors. Edited by Dr. JULIUS SCHWALBE. Leipzig: Georg Thieme. 1921. Pp. 1120. Price (out of Germany), M.230 sewn, M.260 bound.

THIS is the fifth edition of a mélange of technical detail, collected and arranged by Professor Schwalbe, the versatile editor of the *Deutsche Medizinische Wochenschrift*. The book first appeared in 1907 with the laudable aim of affording the practitioner the opportunity of mastering therapeutic technique, so as to avoid constant reference to specialist help. And the editor's aim has evidently been in large measure successful both in view of the demand for new editions and of translations into Italian, Russian, Spanish, and Magyar. The collaborating authors without exception occupy university chairs in the subjects of which they write, and all branches of medicine are covered except obstetrics, the technique of which the editor considered was sufficiently described in the ordinary text-book. Nothing is left to the imagination or omitted because it is obvious. On the first page, which opens the section of the preparation and use of drugs, is an illustration of a caustic applicator in three parts; in the second section on immuno-therapy is shown the method of giving an intramuscular injection, and all the brands of serum on the market are enumerated;

in the third section on dietetic therapy detailed diet sheets are given for diabetes and oxaluria; section four on hydrotherapy contains numberless photographs and diagrams of baths, douches, and packs; and so on throughout the book. The result is a completeness in trivialities that rather obscures the solid worth of new and exact technique in many specialties. The book is without parallel in any other tongue. H. A. Hare's "Modern Treatment" and A. S. Morrow's "Diagnostic and Therapeutic Technic" are the nearest approach to such a book in the English language. It may also deserve attention from the British or American student as affording a ready method of becoming familiar with German medical terms.

---

FROM CLOUD TO SUNSHINE: ALGIERS AND ALGERIA. Tenth edition. By ALFRED S. GUBB, M.D. Paris, M.R.C.S. Eng., D.P.H. London: Baillière, Tindall, and Cox. 1921. Pp. 109. 3*s.* 6*d.*

Dr. Gubb has already published several books, in French and English, on various aspects of Algeria. The volume under review, which is called the tenth edition, but is in many respects a new work, deals with the country as a winter health resort; the new edition is profusely illustrated, and the climate and topography receive careful attention with reference to numerous diseases. Concerning chronic affections of the respiratory tract, we read that physicians of remote antiquity, Celsus (25 A.D.) among them, were accustomed to send their chest patients to North Africa; and Sir Hermann Weber is quoted to the effect that early chronic cases of phthisis benefit by a winter season in Algiers if high altitudes are not well borne by them, and if Egypt and the Riviera are too dry. Freedom from sudden changes of temperature renders the country very suitable for asthmatic persons. Dr. Gubb passes on to mention the climatic advantages for those suffering from kidney and heart diseases, circulatory disturbances, arterio-sclerosis, rheumatism, neuritis, gout, and debility. The therapeutic aspect of Algeria does not, however, occupy the entire book; interspersed with pages on prevailing winds and mineral springs are interesting details concerning the customs and appearance of the inhabitants of the country and the life of the French and native quarters of the city of Algiers, together with notes on the many places of historical and artistic interest which may attract the traveller. Means of transport, hotel accommodation, and useful hints as to selection of a house for temporary or permanent residence, all find a place in an attractive little volume.

---

## JOURNALS.

*Journal of Physiology.* Edited by J. N. LANGLEY, Sc.D., LL.D., F.R.S. Vol. LIV., Nos. 5 and 6. 1921. Cambridge University Press. Pp. 319-414. 9*s.*—The Metabolism of the Salivary Glands. I. The Relation of the Chorda Tympani to the Nitrogen Metabolism of the Submaxillary Gland, by G. V. Anrep. In 1851 Ludwig found that in protracted secretion the submaxillary gland is gradually exhausted and that in consequence the percentage of organic solids secreted in the saliva diminishes as the secretion goes on. Heidenhain in 1868 showed that in the dog the mucin in the saliva arose from a clear substance in the cells, that during secretion the gland lost weight and that the percentage of solids in it is decreased. Dr. Anrep's experiments were directed to the problem of nitrogen metabolism in the secretory process. Having established by the comparative estimation of the nitrogen content and weight of the submaxillary glands of the dog that the two glands show complete concordancy, the determinations justified the assumption that the submaxillary glands on both sides contain practically the same amount of nitrogen. The effect of chorda stimulation on the total nitrogen metabolism of the gland was first determined, then the secretion of mucin nitrogen and non-mucin nitrogen, and subsequently the relation of mucin nitrogen and non-mucin nitrogen to the nitrogen output and intake. Dr. Anrep confirms the old statement that during secretion produced by stimulation of the chorda tympani the output of nitrogen by this gland is greater than the loss by the gland. The excess of the nitrogen output over the loss by the gland increases with increase of output. The output of mucin nitrogen, which, as is known, decreases during secretion, ceases altogether after a time, and is equal to the loss of nitrogen by the gland. The output of the non-mucin nitrogen continues after the output of the mucin nitrogen has ceased, proceeding at the same level throughout the secretion, and is equal to the excess of output over the loss. Its mean percentage in the chorda saliva is 0·018 per cent. The results show that within the limits of experimental error the mucin of the saliva comes entirely from the mucin or mucinogen pre-stored in the gland, that the non-mucin nitrogen is derived from the body fluid, and that no formation of mucin or increase of nitrogenous cell substance takes place during chorda stimulation.

The Temperature Coefficient of the Velocity of a Nervous Impulse, by A. V. Hill. The phenomena of a nervous impulse have been compared with those of a chemical system, such as a train of gunpowder, and Keith Lucas has shown that the velocity of a nervous impulse is increased 1·79 times by a rise of temperature of 10° C. It has been argued that this is a sign of the chemical nature of the changes underlying the propagated disturbance in a nerve. Professor Hill points out that the nervous impulse consists of two separate things: the change at a given point and the transmission of that change to a neighbouring point. At present, however, we are ignorant of the relative importance of the two phases. The temperature coefficient found by Keith Lucas for the velocity of propagation is higher than that of most physical changes. We cannot conclude, however, that the reactions underlying the nervous impulse are chemical in nature, but only that a chemical change interposes *somewhere* in process, occupying a large part of the time of propagation, which may be an important or a relatively unimportant link in the chain of actions constituting the propagated disturbance.

Studies on Muscular Contraction. II. The Relation Between the Maximal Work and the Tension Developed in a Muscle Twitch, and the Effects of Temperature and Extension, by Yasukazu Doi. At a constant temperature the maximal work done by a muscle excited by a single shock has a maximum value with a moderate initial extension of the muscle. Before this optimum extension is reached the absolute maximum work increases, and beyond this optimum it decreases with increasing extension. The absolute maximum work done in a twitch at the same extension of a single muscle is greater at a lower temperature than at a higher. The optimum extension is shorter at a lower temperature than at a higher.

Variations in Alveolar Carbon Dioxide Pressure in Relation to Meals, by E. C. Dodds. All the samples were collected and analysed by the Haldane methods from three healthy men and from a man from whom the greater part of the stomach had been removed. In normal persons the alveolar carbon dioxide pressure showed the following changes after a meal: (1) a rise of from 2 to 6 mm. within the first half or three-quarters of an hour; (2) a subsequent fall of about the same amount (2-6 mm.) below the original level; (3) a return to this level. In the man operated on the rise after a meal was very small in amount (0·4-0·8 mm.), while the subsequent changes were similar to those seen in a normal person. To Dr. Dodds it seems probable that the rise is associated with the secretion of gastric juice, and the subsequent fall with the later processes of digestion.

On the Supposed Identity of the Water-soluble Vitamin B and Secretin, by G. V. Anrep and J. C. Drummond. In 1919 Voegtlin and Myers put out the theory that the anti-neuritic vitamin and secretin are possibly one and the same substance, basing their view on certain observations. Dr. Aurep and Dr. Drummond find that this suggestion is not supported by experimental evidence—e.g., extracts prepared from yeast which show marked growth-promoting and antineuritic properties have no specific action on pancreatic secretion, differing in this respect from secretin. The pancreas of a cat showing typical symptoms induced by a diet deficient in the vitamin B responds in a normal manner to secretin. Secretin can be extracted from the mucous membrane of the intestines of cats, showing the so-called polyneuritic condition to a very marked degree.

The Action of Ions upon the Frog's Heart, by I. de Burgh Daly and A. J. Clark. The authors' experiments were directed to analyse the effect upon the mechanical and electrical responses of the frog's heart of changes in the concentration of the kations, which are normally present in Ringer's fluid. The effects produced by the various changes of ionic content are obviously of very great complexity. Alterations of the concentrations of the ions, if sufficiently extensive, impair all the functions of all parts of the heart, but a moderate degree of change affects the different regions of the heart to an unequal extent, and also acts with different intensity upon the different functions of the ventricle. Alterations of the potassium content produce a greater impairment of the conduction of the electrical variation, both from auricle to ventricle and within the ventricle than any other ionic change studied. Reduction of the calcium content has little effect upon the conduction of the electrical variation. Potassium and calcium are true antagonists as regards

their effect upon the muscular response, but they act as antagonists only to a very limited extent as regards their action on the conduction of the electrical variation. Lack of sodium shows a striking resemblance to the effect of strophanthin. Lack of potassium or sodium and excess of calcium all produce increase of systolic tone in the heart and produce rather similar variations in the electric response; increased alkalinity, which produces increased systolic tone, produces different effects upon the electrical response.

The Immediate Action of Volatile Substances, by W. E. Dixon and Fred Ransom. The object of this paper is the demonstration that the immediate physiological effects produced by certain volatile substances are most readily explained by their physical properties. Two types of experiment were performed: (*a*) on the bronchioles and (*b*) perfusion of isolated organs. The bronchiolar experiments were made on pithed cats, artificial respiration being performed and the blood pressure recorded from the left carotid artery and the condition of the bronchioles gauged by measuring the volume of the middle lobe of the right lung. A great many irritant substances, when inspired in very small quantities, cause broncho-constriction—e.g., ammonia gas, chlorine and bromine vapour; the principal feature of this action is the long latent period, generally 15 to 30 seconds. Chloroform, volatile and possessing little irritant properties and relatively non-poisonous, causes an immediate sudden constriction of the bronchioles lasting 10 to 12 seconds. The first action of alcohol, chloroform, ether, amyl nitrite, petroleum ether, and many other volatile substances administered by inhalation, is to cause broncho-constriction lasting about 30 seconds. The same substances injected into the perfusing fluids of surviving organs of the cat and dog, artificially perfused, cause vaso-constriction lasting about 30 seconds. Professor Dixon and Professor Ransom state their reasons for believing that this action is due to physical processes.

Studies in the Regeneration of Denervated Mammalian Muscle. IV. Effects of Massage and Electrical Treatment in Secondary Sutures, by F. A. Hartman and W. E. Blatz. The tibial nerves in rabbits at the primary operation were severed under aseptic conditions, the cut ends being separated by various procedures in order to check regeneration of the proximal end until the desired time—varying from 1 to 7 months. The denervated legs were carefully protected. When desired the two ends of the nerves were freshened and brought together by suture. The power of the gastrocnemii groups of the two sides was tested by galvanic stimulation immediately after denervation, and at frequent intervals until the conclusion of the experiment. The gastrocnemius group of the right side was treated almost daily by either a slow surging galvanic current or by massage. Of 125 rabbits started in this research, 60·8 per cent. possessed stronger muscles on the right side (gastrocnemius group), the remainder being stronger on the left. Neither massage nor electrical treatment appeared to benefit the denervated muscle.

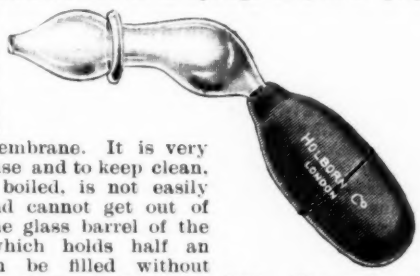
On the Fibrillation of the Heart, by S. de Boer. If a bloodless heart of a frog is taken, a single electrical stimulus is capable of causing fibrillation of the ventricle. A bad metabolic condition of the heart favours fibrillation. Essential factors in fibrillation are decrease in the rate of conduction and in the duration of the refractory period, so that a circulating excitation can be set up. A single stimulus, in order to produce fibrillation in the bloodless heart, must be applied directly after the refractory period. At this time the excitability of the muscle is slight, and a slowly-travelling contraction with a brief refractory period is produced, so that when the contraction completes its circuit the muscle is again excitable and the contraction can spread again and again round the heart. The stimulus, if applied later, gives rise to a complete coördinated extra-systole. Dr. de Boer concludes, from the deflections recorded in the electrogram and suspension curves of heart peristalsis after poisoning with digitalis and of fibrillation of short duration, that in fibrillation the excitation wave passes round the heart in a series of stages, each being marked by a deflection, and that the *local* circulating excitation assumed by the observers Mines and Garrey does not exist. According to Dr. de Boer's theory fibrillation of the ventricle consists of a linking together of fractionated ventricular systoles.

On Recurring Extra-Systoles and their Relation to Fibrillation, by S. de Boer. When a stimulus is applied to the ventricle of a bloodless frog's heart, a short time after the end of the refractory period, a series of extra-systoles may occur. But when the same stimulus is applied at a longer interval after the end of the refractory period to a heart capable of giving a series of extra-systoles, one extra-systole only is produced. It appears, therefore, that the phenomenon of recurring extra-systoles (Häufung d. Syst.) only occurs when the heart has not recovered its metabolic state. In this state the excitation wave is conducted much more slowly, the refractory period is shorter, and the excitation is able to pass round and round the ventricle—i.e., a circulating contraction is set up. Conduction through the muscle is slowed both in recurring extra-systoles and in fibrillation; the difference between the conditions being that in the former conduction takes place evenly, and in the latter it takes place in stages. The intimate connexion of the two phenomena is shown by the fact that each may pass into the other.

# New Inventions.

## IMPROVED STERILISABLE URETHRAL SYRINGE.

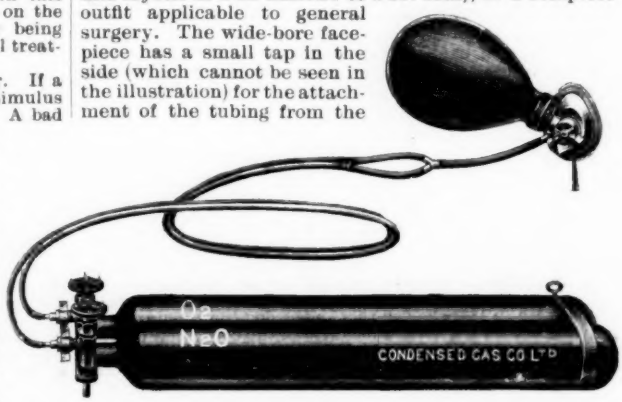
THE illustration shows a syringe shaped to plug the meatus efficiently without causing pain or injury to an inflamed mucous membrane. It is very simple to use and to keep clean, it can be boiled, is not easily broken, and cannot get out of order. The glass barrel of the syringe, which holds half an ounce, can be filled without drawing any fluid into the rubber bulb. The syringe is made by the Holborn Surgical Instrument Company, of Thavies Inn, London, E.C. 1.




FREDERICK H. PICKIN, M.R.C.S., L.R.C.P. Lond.
Westminster, S.W.

## CONTINUOUS GAS AND OXYGEN APPARATUS.

THE special features about this apparatus, which has been in use for more than two years are (1) its simplicity (it consists of no more than the essentials), (2) the re-designing of each important part with a view to efficiency, and (3) the formation in conjunction with the warm ether "bomb" (described by Dr. S. R. Wilson and myself in THE LANCET of Feb. 12th), of a complete outfit applicable to general surgery. The wide-bore face-piece has a small tap in the side (which cannot be seen in the illustration) for the attachment of the tubing from the "bomb." The oxygen cylinder valve is the outcome of considerable experiment, differing entirely from other makes. A clip for the ends of the cylinders keeps them rigidly locked together and there are no high-pressure connexions. The design of the stand is for a horizontal position of the cylinders, which are controlled by foot-keys, the gases being admitted in puffs, as desired. An upright stand with hand-control can, however, be supplied. The former method leaves both hands free and is quite satisfactory.




Full particulars can be obtained from the makers, the Condensed Gas Co., Ltd., 59 and 63, Grosvenor-street, All Saints, Manchester.

K. B. PINSON, M.B., CH.B. Birm., M.R.C.S.

# THE LANCET.

*LONDON: SATURDAY, APRIL 23, 1921.*


## The Position of the Voluntary Hospitals.

THE plight of the voluntary hospitals remains precarious. In recording last week the proceedings at the annual meeting of King Edward's Hospital Fund for London we said enough to show that, especially in the metropolis, great anxiety remains as to the maintenance and conduct of these institutions. There would be no need of pointing this out if it had not been that the whole position appears to be lighter, and there is risk that the public as well as the medical profession should think all danger to be past. The precarious situation of these hospitals was revealed at meeting after meeting and in report after report a few months ago, and then we all knew the serious situation which had to be met. The circumstances leading to the situation have not been modified in any important way, prices have not dropped much, service is not more economical, accident rates have not changed, and only in the incidence of sickness has there been some improvement. All the opportunities for bankruptcy of the hospitals remain, and as long as this is so, it is inevitable that the needs of the institutions should again force themselves upon our attention. What, of course, has happened is that two very large capital sums have been distributed in relief of emergency—namely, £250,000 from the Red Cross and £200,000 by King Edward's Hospital Fund for London—and we have all been sharing in the temporary feeling of ease. This is a state of mind which has to be altered.

We doubt whether the public quite realise that these enormous grants were of an emergency nature and that they were made from capital funds, which means that their repetition cannot be expected. Their receipt by the hospitals enabled the institutions to gain breathing time, and it is obvious that the further strenuous efforts expected must be put into action. In the report of the General Council of King Edward's Hospital Fund for London the special features of the metropolitan hospitals are noted, and the summaries of receipts and distribution present the following outstanding features. The annual subscriptions and donations to the Fund, including £16,000 from the League of Mercy, amounted to £50,000. The London Schools Hospital Fund £10,000, the King George's Fund for Sailors £4000, have to be added, as well as £130,000 from investments and legacies. The Samuel Lewis estate brought £18,000. The total general receipts amounted to £215,800, the discrepancy being due to our not taking account of the small figures in the different items. To this sum is to be added the large sum received from the surplus funds of the British Red Cross Society and Order of St. John of Jerusalem, making, with the interest accrued thereon, over £255,000, and bringing the receipts of the Fund up to the grand total of £471,000. This is a magnificent recognition of the critical nature of the position. There have been distributed £700,000 accounted for in this way; ordinary distribution, £200,000; distribution of Red Cross funds, £250,000; and an emergency distribution of a further £250,000. That is to say that the Fund distributed £230,000 more than it received, and has incurred a capital loss equivalent to an annual income of £16,000. The way in which that money was distributed was set out in detail in THE LANCET on Dec. 25th last, and the only comment it is necessary to make is that the awards were made with scrupulous care and that the needs which were met were of a most urgent character. The last paragraph of the Report may be quoted. "All who believe in the voluntary system must make a special effort to support the hospitals during the present crisis, and to ensure that voluntary contributions form at least a substantial part of their income in the future. The Fund has helped to meet the first need by the emergency distribution of £250,000. If liberally supported by the public it can help greatly with the second, especially in the case of hospitals which are most in need." The Council in their Report acknowledge the debt to the press for the assistance rendered by publicity; the need for this support remains as urgent as ever.

An Interim Report has now been presented to the authorities of King Edward's Hospital Fund by the King's Fund Policy Committee, a committee appointed to work out the details of the policy to be recommended for the preservation of the voluntary system of hospital management and control. The Report is of a highly practical character. The reference of this Committee was a report from the Executive Committee, passing 13 resolutions dealing with the plans to be pursued for the preservation of the voluntary system of hospital management and control. It was required of them to work out the details of their advice, and to recommend the approved measures to the Government, to Lord CAVE'S Committee, and others directly concerned, including the public. Lord CAVE'S Committee, it will be remembered, has already reported that it is desirable in the public interest to maintain the voluntary system of hospital management. The advice of the Interim Committee may be summarised as follows. The Committee finds that the voluntary system must be supplemented, at any rate temporarily, by other sources of revenue, to be derived, first, from payment in some form or other for specific work, and, secondly from public funds. Payment for specific work includes money from public authorities, from individual patients, and from insurance, voluntary and compulsory. With regard to the first, we must look for payments ensured under the National Insurance Act. With regard to the second, a movement to obtain certain payments in certain circumstances from individual patients has been spreading all over the country. No such system was in existence until less than a year ago, but already promising returns have been obtained. With regard to the third, a comprehensive scheme associated with the name of Dr. GORDON DILL has been put into operation in Sussex and a committee of the British Medical Association has recommended its adoption with modifications by the hospitals of London.

We have attempted to make a coherent story from the records of much complicated investigation and the moral of that story, already indicated, may be repeated. The voluntary system of hospital support is worthy of every effort for its preservation. While the various Committees whose work has been mentioned have been directing their energies mainly to the metropolis, that work has a direct bearing upon the future of all the voluntary hospitals of the country.

## A Solution for the Holiday Huddle.

"It is easy enough to account for the absurd position that most people's holidays are packed into the same period of opportunity (which is generally the month of August or thereabouts), but it is not easy to see why such a silly arrangement is allowed to continue."

WE repeat the opening sentences of an editorial article in THE LANCET a decade ago, as they are just as applicable now as they were then. The English summer still spreads impartially over the months of June, July, and September; often, indeed, May is as merry for the holiday-maker as any of the more orthodox months, and October, in spite of its shortening days, is a kind of Indian summer. And yet, as in 1910, the seaside and holiday season generally is compressed into a month in which accommodation is expensive, hard to get, and crowded, railway companies are more than ever at their wits' end to cope with the sudden demand upon them, and altogether the discomforts and inconveniences are so great that many stay at home in despair, and from a medical point of view there is much to be said for that course. The innocent cause of this prodigious ill is the school child, and its inevitability has never been seriously questioned in any responsible educational organ, though its medical side has been set out for years. A striking article on "No Fixed Holidays" which appeared in the Education Supplement of the *Times* on April 7th breaks the silence in lay journals.

The question of running elementary schools continuously is no new one, and has from time to time been discussed by the London County Council, but on every occasion has failed to gain support, possibly for political reasons and the great convenience of school holidays falling during the recess. And to most of us, whether responsible for the family or the school, the suggestion at first sight raises visions of hopeless disorganisation in the familiar routine of school work, term time, and vacation. Indeed, the initial opposition might be so overwhelming as to veto the proposal entirely. Yet on further and more serious consideration there are undoubted advantages attaching to it. Every business concern and even educational offices are run on continuous lines without any hitch in the machine, holidays being arranged in rotation in order of seniority. Such a system applied to schools, whether elementary or secondary, would necessitate careful planning and arrangement for both teachers and pupils, but it should not prove an impossibility with due coöperation of all concerned and under the control of local educational authorities. It should be possible to arrange without dislocation of school life for the absence of teachers and pupils at regular periods spread over a space of several months, leaving parents some liberty to fix their children's holiday at the same time as their own. The provision of a rota might enable teachers to take each other's duties in turn during the allotted holiday months, with the added advantage of a change of work for a time, when, for instance, the second in charge fills the head's place. Disturbance to class work by the withdrawal of children at various periods ought not seriously to interfere with the continuity of their studies; coming back invigorated by the holiday's change the average pupil should have little difficulty in making good lost ground. Only a rigidly mechanical conception of education can think or speak of the loss as irremediable. Pupils in a class differ too widely among themselves for the absentee to upset the whole system. There are, of course, many children in the elementary schools whose holidays are spent in the streets, the various playgrounds and parks, without prospect of any other change. For these a longer choice in summer might make it possible to arrange for school journeys or camps for periods spread over the several months under the voluntary charge of assistant teachers or other helpers.

The question of the influence of the continuous school system on the course of epidemic and infectious diseases among school children is one, nevertheless, which would need careful consideration. At public schools the beginning of the term is always an anxious time, and day boys constitute a complicating factor in the boarding-school system. The objection would not apply in the same way to elementary schools or to day schools in general. A good deal, on the other hand, is to be said of the strain on all teachers inevitably attaching to the heavy work in the schools at the close and commencement of each term, which the continuous system would do away with. The new continuation classes, if they are to survive, must necessarily run continuously, as those attending them being in employment have no fixed holidays. Is it too much to hope that the suggestion will receive serious consideration upon its merits? Some body similar to the Industrial Research Board might be asked to report upon its actual balance-sheet in work and efficiency.

## The Question of a Trade-Union in Medicine.

IT may be remembered that last autumn in certain mining districts there was a definite movement among medical men to cease work unless their clients paid higher fees. The whole question of a strike among doctors was freely discussed at the time in the lay papers, and while no representative gathering of medical men expressed any opinion on the subject, it was dealt with in a certain number of resolutions. At those medical meetings where the question of a medical strike was debated the conclusion come to in almost every case was, if we remember rightly, that a strike of doctors was unthinkable. It was pointed out on each occasion that even if medical men desired to adopt union tactics to obtain their dues, and even if hard situations, as they arose, could be remedied in such a way, they did not possess a union. And none of those who seemed to regret the fact were able to outline the constitution of a trade-union for medical men which should alike have the powers of the well-known combinations and be able to exercise those powers concomitantly with the discharge by its members of their professional duties.

The story of the past fortnight makes the subject of a medical strike interesting. At a recent dinner held by a branch of the Medico-Political Union, which is an association of medical men contemplating the transformation of medical organisation into a trade-union, Dr. E. H. STANCOMB, a prominent member of the Union, said: "It is the miners' turn to-day, but it may be the doctors' turn to-morrow." He summarised the position taken up by the Medico-Political Union when called on to defend the institution of a medical strike in circumstances where professional protest has remained vain, assuming that this plight had arrived in respect of certain panel regulations. He contended that a medical strike would

be against the Government in respect of the terms and conditions of service, but that no sick person would suffer, and that the strength of the strike would lie in the fact that there could be no blacklegs, as no person could, on the strength of a few weeks of intensive culture, possibly take the place of a professionally trained medical man. Two points arise from this presentation of the case for the establishment of a medical trade-union, and in the consideration of these it is not necessary to make any allusion to ideals of conduct. Ideals of conduct must show their influence personally and are thus removed from the sphere of any occupational organisation. First, a solidarity of opinion among medical men is assumed which no one believes would ever occur. Granted that a strike of medical men could not be broken by blacklegs from without, it is practically certain that it would be broken immediately from within. There could be no need for any Government, resisting a medical strike, to hastily call in the services of unqualified medical men. Within any form of medical union that is conceivable there would be immediate dissentients from the policy of withholding medical service; and, still excluding ideals of conduct from our thoughts, one reason for this is that medicine is not a homogeneous service in which common conditions prevail with all workers. Secondly, in what manner could any medical strike be directed against the Government unless it was primarily directed against the sick and suffering? A middle stage of the operations in a medical strike appears to be omitted from discussion in the arguments of those who desire to see a medical trade-union arrive. It is in this stage that the full force of public opinion would be ranged against the medical profession.

That the medical profession, unable to put the necessary pressure upon a Government, could reduce the public to such a position of need that the voice of a medical trade-union would become paramount, is a sequence of events which we do not believe could ever occur. It is for that reason that we have been unable to support the views of those who are attempting to transform the medical profession into a trade-union, and it is needless to look for others. The extreme weapon of a trade-union is a strike. No medical union that we can imagine would be able to use that weapon with the efficiency that comes from common agreement.

ENTRANCE BOARD REGULATIONS FOR SCOTTISH UNIVERSITIES.—New regulations governing entrance to the Scottish Universities were recently issued by the Entrance Board. The object of the new regulations is to unify the requirements hitherto insisted on for admission to graduation courses in the different faculties, and for this purpose to accept certain group certificates of the Scottish Education Department. The certificate must attest proficiency in four subjects, one being English, in which, as in two of the other three, the higher-grade standard must be reached. The marked departures from the present system are: (1) Neither Latin nor Greek is to be a compulsory subject; (2) mathematics is no longer to be a compulsory subject; (3) art, music, economics, &c., are now recognised as alternative subjects. At its meeting on March 28th the University Court of Aberdeen, having received communications on the subject from the Senatus, including reports from the faculties and from the General Council through its Business Committee, resolved to dissent from the regulations. At a meeting of the University of St. Andrews General Council it was agreed to join with the Aberdeen and Edinburgh University Courts in dissenting from the new regulations. The Courts' objection appeared to be that it is proposed to institute a common test for admission to all faculties, and this was considered to be impracticable.

# Annotations.

"Ne quid nimis."

## A SMALL BASTARDY BILL.

THE Bastardy Bill to be introduced by Captain G. E. W. Bowyer in the House of Commons on April 29th embodies what remained of Mr. Neville Chamberlain's "Children of Unmarried Parents" Bill after the latter emerged from Committee stage. It proposes to appoint the clerk to the justices (or, in London, the chief clerk of a metropolitan police court) as collecting officer under the Affiliation Orders Act of 1914. For some time past it has been difficult to induce any worthy person to undertake this duty, the importance of which will be much enhanced by the much larger payment which, if the Bill becomes law, may be levied on the putative father. It is further proposed that any illegitimate child whose father and mother shall have subsequently intermarried shall thereby, and as from the date of such marriage, be deemed for all purposes legitimate. The National Council for the Unmarried Mother and her Child, which is promoting the Bill, believes that although it does not go very far—care has been taken to ensure a measure of general agreement—lives will be saved thereby and the existence of the unfortunate child who is born out of wedlock deprived of some of its terrors. As such it will command the cordial support of the medical profession.

## THE TRAINING OF THE HOSPITAL ALMONER.

IT is encouraging to find from the report of the Hospital Almoners' Council for the year ended 1920 that in the midst of much that is disappointing in voluntary hospital work nowadays, the Council has succeeded in overcoming many of the difficulties encountered during the war. The Council has a high ideal of its functions, and has set a standard of training which is no light one for the student. Candidates are expected to have had a liberal education, as far as possible up to the university standard, before embarking on the course of training; they should also be women with a wide outlook, broad sympathies, and a genuine interest in the social problems of the day, for, as the report points out, the work of an almoner necessarily implies very considerable interference in the lives of others, and success will depend largely on the spirit of sympathy and comradeship with which the work is carried out. The almoner's departments of the voluntary hospitals must share in the challenge of the modern situation. A considerable part of this challenge is to be found in the new attitude of Labour towards social amelioration, and the "charity" of Dickens's day belongs to a sentimental past. But the most important part of the challenge for the moment is the financial question. Hospitals are seeking to augment their incomes by means of payments from patients, and this policy will be reflected in the increased importance of the almoner. In some cases the payments take the form of a fixed sum paid for each attendance in the out-patient department or for each week's residence in the wards, the latter often estimated by the hospital as the amount to which the family exchequer is lightened by the absence of one of its members in hospital; in others the payments are assessed on a voluntary basis according to the patient's means. In either case, but perhaps more in the latter than in the former, added responsibility and need for tact and sympathetic insight are required of the almoner, who knows the social conditions of the patients in her district. Furthermore, everybody concerned with the treatment of patients in our voluntary hospitals is extremely anxious that money difficulties alone shall not prevent patients who are acutely ill from getting immediate attention, irrespective of their financial position. If rules and regulations as to payments have to be set aside—and it is the hospital's pride that they possess less of that much abused commodity known as red tape

than almost any other British institution—the almoner alone knows the facts on which such decisions have to be made. And when we add to these questions the difficulties which occur daily with regard to ex-Service men and pensions, tuberculous persons and sanatorium benefit, lying-in women and maternity benefit, we are not surprised that a high standard of training is required of the almoner. We are also not altogether astonished that in some hospitals, at any rate, the new situation has proved almost unsurmountable. There is a real danger that the almoner's department may become a registration department where card indexes and account books are accurately kept and the human element is allowed to die out. If the mere registration of patients' payments and pension or grants to the hospitals are allowed to fill the major portion of the almoner's time we must not be surprised if we fail to get the right type of woman for the work.

The supply of trained almoners has hitherto barely kept pace with the demand. The Hospital Almoners' Council course of training extends over a period of two years, during which time the candidate is earning no salary. In addition there is a fee of 40 guineas for the course. This expenditure compares favourably with the cost of training for other professions followed by women, but it is probably one of the reasons why the supply of candidates has been limited in the past. The curriculum of the Council is divided into three parts: (1) three months' whole-time work in an office of the Charity Organisation Society; (2) nine months' (three terms) study under the Ratan Tata Foundation of Social Science and Administration of the University of London, including lectures on social subjects, elementary hygiene, and physiology; (3) 12 months' training in the almoners' department of a hospital training centre. As the Ratan Tata Foundation courses begin at Michaelmas, and as the three months' training with the Charity Organisation Society must precede this, it is necessary for the student to begin her training not later than midsummer.

Arrangements have now been made with some of the provincial universities (Glasgow, Leeds, Liverpool, and Durham) whereby students can take courses of study in these universities equivalent to those of the Ratan Tata Foundation in London. We should like to see this privilege extended not only to other universities but to some of the other branches of study. A practical insight into social conditions in a South Wales mining village or a Lancashire cotton town would widen a student's outlook immeasurably. Perhaps the time may come also when it may be possible for some students, at any rate, to study social conditions in industrial centres abroad.

In conclusion, we should like to hazard the hope that financial assistance, in some such form as a bursary or scholarship, may be forthcoming for training for this valuable new weapon in the armoury of medical sociology. It will be a thousand pities if promising students are lost to this work through lack of means.

## LIPOMA OF THE SUCKING-PAD.

ACCORDING to Dr. Angus L. Cameron,[1] Teaching Fellow in Surgery of the University of Michigan Medical School, the corpus adiposum buccæ or sucking-pad was first described by Gedani in 1725, though Heister is usually credited for the first description in his *Compendium Anatomicum* published in 1732. The sucking-pad is a circumscribed mass of adipose tissue which lies in the cheek, partially wedged between the masseter and buccinator muscles and covered externally by the superficial fascia of the face and the zygomatic muscle, and connected posteriorly by a stalk with a much larger mass of fat which is known as the corpus adiposum malæ. Scammon, who examined the bodies of 42 individuals whose ages ranged from 20 to 60, found the sucking-pad well developed in 34, and in two well developed on one side and practically absent on the other. No relation was observed between the size of the sucking-pad and the age of the individual, nor was its size apparently affected by extreme emaciation. Dr. Cameron has collected 15 cases of tumour of the corpus adiposum buccæ from the literature published since 1848, exclusive of a personal case. Only three of the 15 cases were congenital, the ages of the remaining cases ranging from 10 to 62 years. Six of the patients were males, seven females, and in two the sex was not given. The right side of the face was involved in nine cases, the left in three, and in three the side was not stated. The size of the tumour varied between that of a large chestnut and that of a man's fist. Dr. Cameron's own case occurred in a boy, aged 14, who had had a facial tumour as long as he could remember, though it had only begun to increase in size for the last two years. It was soft, bilobulated, painless, and freely movable under the skin. A distinct sense of fluctuation was observed on external palpation, but the tumour was found to be solid on palpation from the oral cavity. A diagnosis of lipoma of the corpus adiposum buccæ was made and confirmed by operation, when a tumour weighing 36 g. was removed by a small incision in the mucous membrane. It shelled out easily except for the stalk connecting it with the corpus adiposum malæ, which had to be severed.

[1] Journal of the American Medical Association, March 19th, 1921.

## LIFE AFTER DEATH.

Sir Arthur Conan Doyle gave three lectures at the Queen's Hall, London, recently on "Death and the Hereafter," in which he demonstrated different aspects of spiritualism, giving the results obtained by psychical research. In his first lecture he described the investigations of Professor Crawfurd, of Belfast, who has written a book on ectoplasm or psychoplasm—the substance which, it is suggested, emanates from some mediums, and he quoted Thomas Vaughan, the seventeenth century alchemist and poet, in support of the recent observations on the building up of spirit forms. Vaughan, who appears to have derived inspiration from Cornelius Agrippa, described "the first visible receptacle wherein the spiritual things are consecrated, ..... a viscous mass impregnated with all powers celestial and terrestrial; ..... it may be seen with the eyes and felt with the hands; ..... it alters every moment; ..... it is almost animal; it is the mother of all things; ..... it is a thick water which is dry and wets not the hands, a most delicate substance, and tender; ..... the least violence destroys it, even the vibration of light." Such a substance seems to be what we are asked to believe can be materialised and dematerialised by mediums.

Sir Arthur Conan Doyle's attitude towards his audience, as befitting a medical man, was not pontifical or dogmatic; it was that of an investigator who felt bound to pass on information which he had obtained and to relate what he had actually experienced. The experiments conducted with a medium called Eva in association with Madame Bisson, and recorded by Dr. Schrenck Notzing,[1] were described, and the lecturer told how he had actually seen and touched the mysterious substance emanating from mediums. In the second lecture stress was laid on the religious argument with spiritualism, and the lecturer deplored the fact that the Church had rebuffed investigators, instead of working with them as allies, to prove the existence of a life after death, and to confute materialists. He showed that the Fathers of the Church recorded fully spiritual phenomena, in the days when each church was ordered to have three discreet women, one with the gift of healing and two with spiritual gifts, quoting St. Augustine, Origen, Tertullian, and Jerome as describing occurrences similar to those found in the publications of the Society for Pyschical Research. Further, he claimed that St. Paul's list of spiritual gifts (I. Corinthians, xii., 8–10) is an exact description of the powers of mediums, clairvoyants, and clairaudients. He added that in his view there were no such things as miracles, but that everything is done by law, our failure to understand being due to conflict between old knowledge and knowledge later acquired.

[1] THE LANCET, April 16th, p. 809.

The third evening was taken up with a display of spirit photographs. Certain of these showed mediums with masses of viscous-looking ectoplasm issuing from their bodies, and these masses, the lecturer stated, could not be detached without doing harm to the medium, as at the end of the trance it was reintegrated into their bodies. But he said that a small portion had been taken from the medium Eva and sent to analysts, who had decided that it had all the constituents of the human body. Certain obvious reflections in this connexion will have occurred to Sir Arthur Conan Doyle; he must know that before members of his own profession will pay heed to such "evidence" of life after death they will require proof that every step in this analysis has been undertaken with precautions against fraud and error.

## ERYTHRŒDEMA.

IN 1914 Dr. H. Swift, of Adelaide, described at the Australasian Medical Congress a peculiar group of symptoms characterised by redness and swelling of the hands and feet, which he had observed in children. He termed it "erythœdema," but did not regard the word as satisfactory as the swelling did not pit on pressure. Comment was subsequently made upon these cases in our columns.[1] In the *Medical Journal of Australia* of Feb. 19th last Dr. A. J. Wood has published an important paper on the subject. He states that he has frequently seen such cases in Melbourne during the last 30 years, and that before his time Dr. W. Snowball, of the Children's Hospital, recognised the complaint, and spoke of it as "raw beef hands and feet." In Sydney the condition has also long been identified and spoken of by Mr. C. B. Clubbe and others as "the pink disease." Dr. Wood has now notes of 40 cases. Of the ætiology and pathology nothing is known. The majority of Dr. Wood's patients were between the ages of 8 and 18 months, but children at the breast as young as 3½ months and children as old as 3½ years have been attacked. The symptoms when well developed are most characteristic. The child is brought with the head bent down, generally into its mother's chest, or frowning with half-closed eyes, as though it dreaded the light. Usually it is whining and fretful. Some patients are restless, scratching at the feet or pulling at the hair and ears. If placed on the floor they bend forward so that the head almost touches the feet. They do not smile, and resent any attempt to amuse them. In some cases the red swollen appearance of the hands is an early and pathognomonic symptom. The children are worn out from want of sleep, and in distress from intolerable irritation of the skin of the body, hands, and feet. In young infants the earliest symptoms are fretfulness, insomnia, and disinclination for breast or bottle. After a week or two they may perspire freely, and a profuse irritable sweat rash appears. A little later (two or three weeks), or as late as four or five months after the onset of the fretfulness, the redness of the hands and feet appears. Muscular wasting is an early symptom. Stomatitis is common, and photophobia is very frequent. The itching leads to scratching, which may cause breaches of the skin, to be followed by ulceration. The redness of the hands and feet is accompanied by icy coldness to touch, and small vesicles may form. Loss of finger- and toe-nails is not rare. The axillary and inguinal glands may be enlarged. The rectal temperature is generally about 100° F., but is higher when complications, such as broncho-pneumonia, occur. Loss of weight takes place, though the food seems to be well digested. The urine is scanty. The first evidence of improvement is return of sleep and gain in weight. The prognosis is good, but the duration varies from three months to a year. Five deaths have occurred in 91 cases, but in only one could it be shown that death was not due to the complication of broncho-pneumonia. The treatment consists in sending the child to the country and leaving it as long as possible in the open air. For the sweating and irritability of the skin great relief is afforded by rubbing the whole body at least twice a day with methylated spirit and dusting with zinc and starch powder. For underwear a loose silk garment is preferable. For the irritable fingers and toes painting daily with tincture of iodine is satisfactory. If this seems too strong an application it may be diluted with an equal part of methylated spirit. Drugs do not seem to be of much use. For the insomnia trional, chloral, bromide, and opium have been given. Liq. opii sed. has been employed without relief. Sleeping in the open air in the country has succeeded when every form of hypnotic has been pushed in the city without effect. When methylated spirit or iodine has failed to relieve the itching it may be necessary to apply cardboard splints to the arms to prevent deep scratching.

[1] THE LANCET, 1918, i., 611.

## NON-TUBERCULOUS APICAL DISEASE.

Dr. G. Liebermeister,[1] of Düren, reports having recently seen 15 cases following influenza in which the clinical appearances closely resembled tuberculosis of the apex. No tubercle bacilli, however, were found in the sputum, Pirquet's reaction was negative, and no reaction followed injections of 0·1 to 10 mg. of tuberculin. In 7 of the cases, indeed, the doses were increased to 200 mg. old tuberculin and 2000 mg. of bacillary emulsion without any reaction. He therefore considers that a tuberculous ætiology could be excluded with a fair degree of certainty. Fourteen of the cases recovered, although in some of the patients the apical signs were very persistent and it was many weeks before they finally disappeared. In the one fatal case severe hæmoptysis occurred, but no tubercle bacilli were found in the sputum in spite of repeated careful examinations, and the diagnosis of influenzal broncho-pneumonia was confirmed by the autopsy, at which no evidence of tuberculosis could be discovered. Dr. Liebermeister concludes by saying that it is most important at the present time, when influenza is so prevalent, to make an exact ætiological diagnosis in cases of apical disease of the lung, so that tuberculosis should be recognised and treated as early as possible and so that, on the other hand, the diagnosis of tuberculosis should not be made in the non-tuberculous.

[1] Deutsche medizinische Wochenschrift, March 10th, 1921.

## HOME AMBULANCE SERVICE.

AMONG the problems calling for anxious consideration during a period of national emergency are those that concern the maintenance of hospital supplies, the provision of means to secure the transport of the sick to hospital from outlying areas, and the demands that may arise for the removal of the injured in any disturbances that may take place. Existing circumstances have afforded proof of the value of the Home Ambulance Service—one of the peace activities of the Joint Council of the Order of St. John and the British Red Cross Society. Under this scheme there are approximately 300 ambulance stations established in the country under the administration of county directors. Although these motor ambulances are exempt from the payment of licence duty on condition that they are used solely for the transport of the sick, it was felt that under the recent conditions the scope of their work must be extended if necessity arose. Thus, after consultation with the Ministry of Transport, instructions were issued to county directors that if they were called upon for the purpose of helping to maintain the essential supplies of the hospitals and convalescent homes in the country, the fullest possible use might be made of them for that purpose so long as the Ministry of Transport's special permission lasted. A day or two later, when military plans for safeguarding public interests developed, it became evident that an organisation having ambulances distributed throughout the country would be of invaluable service should disturbances occur, and, at the request of the War Office, county directors were further instructed that arrangements should be

made so that, by coördination of the work of the ambulance stations, every possible assistance should be given to the authorities in dealing with casualties, while at the same time a minimum of dislocation should be caused to the hospital services and the normal work for the sick. It is even more necessary, of course, to maintain the independence of the Red Cross at times of civil disturbances than during war with a foreign State, and this was recognised by the military authorities, who issued orders that the ambulances should remain entirely under the control of the county directors and should not be driven by enlisted men. Similar arrangements proved entirely satisfactory during the Luton riots in July, 1919, when a large number of casualties were picked up by the Home Service Ambulance.

The normal work of the Service continues to give evidence of its value as a unit of the forces fighting disease, the latest report showing that 46,294 cases have been carried in the ambulances since the establishment of the Service less than two years ago.

## CREEPING ERUPTION.

ACCORDING to Dr. Joseph Victor Klauder and Dr. Sigmund S. Greenbaum,[1] of Philadelphia, who report a case in a girl aged 6 years, creeping eruption, or larva migrans, which was first described by Lee in 1874, is a relatively rare disease in the United States, where only 13 cases have been recorded. The disease is commonest in Russia, and is also prevalent in the Shetland Islands and in Norway, as well as among Arabian children, whose mothers are said by Lee to burn the part affected with a hot wire. The eruption is due to a larva which is generally regarded by entomologists as the *Gastrophilus hæmorrhoidalis* of the horse. This organism measures from 1 to 1·5 mm. in width, possesses ten segments, and has hooklets which are more prominent at the cephalic end. Two suckers are present at the head end and two club-like processes at the tail end. There are two tubes in the interior of the organism. The disease is most frequent in children. The parts most commonly affected are the hands or lower parts of the forearms, the feet, and lower parts of the legs. In exceptional cases the face, buttocks, genitalia, and trunk are involved. The characteristic lesion is a burrow, which is a raised erythematous linear lesion, serpiginous, and at times circinate in outline. The lesion is most distinct at the extending portion, and tends to disappear at the older and traversed part. Sometimes the burrow is composed of linear vesicles. On diascopy the larva is seen as a black speck at the advancing end of the burrow, whose rate of progress varies from a fraction of an inch to seven inches in the 24 hours. In most of the recorded cases only a single burrow was found, but in the present writers' case there were five separate and disconnected burrows. The duration of the disease is variable; not uncommonly it lasts for some months. Unless secondary infection occurs, there is little local reaction to the presence of the parasite. Histological examination shows that the burrow is present in the upper part of the epidermis between the stratum corneum and the rete Malpighii. The eruption is readily amenable to treatment by local applications of nitric acid, phenol, tincture of iodine, chloroform, and 2 per cent. salicylic acid in collodion.

## BELGIAN METHODS OF ANÆSTHESIA.

TWO new methods, or rather two modifications, in recognised methods of anæsthesia are reported from Belgium,[2] where they have been put to a preliminary test. The first is a method of general narcosis, using a mixture of equal volumes of chloroform and ether plus half a volume of ethyl chloride. One and a quarter hours before the administration of this mixture a subcutaneous injection is given containing dionin and heroin, 0·005 g. of each; morphine, 0·01 g.; hyoscine hydrobrom., 0·0001 g. The dose is larger in muscular or alcoholic subjects. It is claimed that anæsthesia so induced is free from anxiety both to patient and operator. The amount of chloroform necessary is so small that there is no danger of syncope or delayed poisoning. The hyoscine removes "the harmful brake resulting from stimulation of the vagus." The pulse remains strong and regular throughout the whole anæsthesia. The patient breathes deeply and the colour is good. Heroin lowers the excitability of the lung surface, increases the ventilation without increasing the respiration-rate, and diminishes the "chloroform appetite." The dionin and morphine relieve the patient of anxiety and aid in establishing gradually the state of narcosis. The method was devised by Dr. Le Clerc-Dandvy. It is used only at ages over 17 years. Dr. Albert Govaerts, of Brussels, gives a list of 14 operations in which this method was used. Anæsthesia lasted from 45 minutes to 1½ hours. The amount of chloroform required varied from 3·5 to 11 c.cm. In one case, however—an operation for nephrectomy on an alcoholic subject lasting 1 hour—50 c.cm. of the mixture, and therefore 20 c.cm. of chloroform, were necessary.

The second method consists in the substitution of 4 per cent. scurocaïne for stovaïne in spinal anæsthesia. The technique is also modified. Dr. G. Spehl, the originator of this modification, uses a 10 c.cm. syringe. The injection is made in the first or second lumbar space. A small quantity, not more than 4–6 c.cm., of cerebro-spinal fluid is allowed to escape, the syringe containing 4–12 cg. of scurocaïne is adjusted, and the piston withdrawn to the 10 c.cm. mark. After an interval one-half of the resulting mixture is injected and the other half after a second interval. The head of the patient is kept flexed on the chest and is raised throughout. After the injection the patient lies on the back with head well raised and the table is tilted from the feet at 10° to the horizontal. Anæsthesia is complete in 10 minutes. When the injection is made in the first lumbar interspace anæsthesia extends up to the clavicles. Twenty-eight observations have given encouraging results, headache and vomiting occurring in five cases only. More complete data are promised for later publication.

## FAMILIAL VARIATION IN RESISTANCE TO INFECTION.

AN extensive experiment on the effects of in-breeding of guinea-pigs has been in progress at the U.S. Bureau of Animal Industry at Washington since 1906. A number of pure in-bred families have been developed by persistent brother-sister matings, which show permanent differences in respect of colour-pattern, polydactyly, infant mortality, and weight. Dr. S. Wright, of Washington, and Dr. P. A. Lewis, of the Henry Phipps Institute in Philadelphia, give[1] a most interesting account of experiments which they have made on the resistance of these families to inoculated tuberculosis. The difference may be very marked. Thus, with intra-peritoneal inoculation all of family 32 were dead at the end of 25 days, when 60 per cent. of family 35 still survived; with subcutaneous dosing the whole of the animals from family 32 had perished in 47 days and only 30 per cent. of those from family 35. In crosses with other resistant families the most resistant family transmitted its resistance by either sex to the offspring of either sex, and the progeny were superior in resistance to the most resistant family itself. Resistance to this form of infection appears to be independent of other elements of vigour, such as weight, rate of growth, or size of litter. Apart from their inherent interest, these observations seem to be important from two more general points of view. In the first place, they furnish most favourable material on which to resume once more the hunt for the factors—anatomical, chemical, or what not—on which resistance depends. Dr. Lewis is inquiring into the relation between resistance to tubercle and resistance to other

[1] Archives of Dermatology and Syphilology, April, Part I., 1921.
[2] Le Scalpel, 1921, pp. 201, 269, and 277.

[1] American Naturalist, vol. lv., 1921, p. 20.

infections, into any discoverable differences in the constitutions and economics of the two sets of animals, their phagocytic and antibody mechanics, and his results will be awaited with much interest. In the second place, the observations emphasise the care and circumspection with which experiments must be interpreted by forcing on our notice a factor which has hardly been suspected before. A race of guinea-pigs which have the audacity to have no end-piece to their complement has lately been revealed, and it is evident that if quantitative inoculation experiments are to reach their highest accuracy they must be made on a genetically homogeneous population. Evident, too, that along these lines one may look for reconciliation between divergent sets of observations. Perhaps in future our experimental animals will have to be as guaranteed as our dyes and chemicals.

## THE DIET OF THE WEANLING.

THE neglect of the general practitioner to make himself familiar with the principles of feeding advocated at infant welfare centres has been freely criticised in certain circles. But are there as yet any well-recognised principles, excepting the desirability of breast feeding till the ninth month, on which there is general agreement? And if there are not, is not the general practitioner justified in depending upon his own experience, rather than upon pronouncements which themselves are in question? The report of a meeting of the Society of Medical Officers of Maternity and Infant Welfare Centres in our present issue shows that there is little unanimity on the subject of the proper feeding of infants between 9 months and 5 years of age. The assumption that the bulk of the food supplied to babies should be cow's milk, of which large quantities should be consumed, appears on the evidence submitted to be founded on slender enough basis, though milk certainly seems a useful and palatable vehicle for fats and for water. The mother familiar to us all, who gives her baby just "a snack of what we eats ourselves," used to be held up to execration, and, indeed, in most middle-class circles would still be accounted blameworthy. But, according to one expert, the mother who, on being asked why she gave her infant a chop, said that it was because "he won't eat pork," was selecting the most suitable food by the most rational experimental method—that of trial and error. To select apparently healthy children, to ascertain as a matter of interest what they habitually eat and recommend those in charge to carry on, may be a reasonable method, but it does not lead us much further. Dr. Harold Waller admits that sick and weakly children cannot be brought back to health by the varied diet that may be suitable to maintain the robust child in vigorous development, and the question remains whether the healthy child flourishes in spite or because of its food. The diet recommended by Dr. J. Sim Wallace as prophylactic against carious teeth appears to have been welcomed by many medical officers, possibly because to follow definite rules is always some satisfaction when facing a difficult problem. But the view that good teeth depend on general conditions, on resistance to infection, and on proper development of the mouth and jaw promoted by nasal breathing, appears more convincing to us than does the mechanical cleansing theory. In the nursery, manners and habits other than dietetic are formed, and a child who is allowed to chew but not to swallow crusts, or one who is encouraged to discard and eject, to bite and tear and worry food will have much to unlearn if he or she is ever to be a pleasant table companion. Moreover, those who focus their attention on dental caries appear to think only in terms of masticatory power, whereas good digestive habits have also to be acquired. The question of bulk is important in connexion with constipation, and the strength of the digestive juices in the young child remains to be ascertained and considered. The chronic epigastric malaise, for which no organic basis can be found, from which so many overworked members of our own and other professions suffer, may be traceable to dietetic indiscretions in early youth.

We know well that it is only the uninformed who are positive and that wheresoever a party of experts is gathered together there also is dissension. But we hope that this Society in the future may be in a position, as the result of its pooled experience, to tell us with some measure of authority what may be considered a dietetic indiscretion in an infant.

## "THE FIGHT AGAINST DISEASE."

UNDER this broad title appears the first number of a journal which is to replace the reports hitherto issued quarterly by the Research Defence Society to its members. It will be published six times a year by Macmillans, will cost only 6*d*., and will be placed on the tables of the chief public libraries. The design of the Society appears to be the provision of accredited abstracts and reviews of recent research work in a form intelligible to the lay public, a function corresponding to that subserved by the Medical Research Council to the profession. Since nearly all modern developments in medicine have an experimental basis, the alteration will involve but little change in the character of the publications issued by the society, which will now, however, be made available to a much larger circle of readers. At present the public greedily consumes whatever diet—sometimes unnecessarily meagre, too often indigestible and excessively spiced—it is offered on medical subjects; a periodical giving reliable and simple accounts of recent advances should have success, though it cannot be sure of it. Though the days of sharp fighting for the rights of experimental work are practically over, medical research has other enemies besides the fanatics who would shackle it by force, and in the times of national penury ahead may have to be protected from starvation. The first number of the new journal reviews recent work on protection against tuberculosis and on Malta fever, and comments on the hospital stalls at the Efficiency Exhibition, outlining a constructive scheme for a permanent health exhibition under the auspices of the Ministry of Health. Annotated extracts from lectures recently delivered by Sir Charters Symonds[1] and Professor F. Hobday[2] show the beneficial potentialities of the comparative study of medicine and surgery not only for man but for animals. In the short obituary notices of Lord Moulton and Sir Felix Semon, which complete the number, the following words, spoken by Lord Moulton in 1907, show that the new journal is a natural development of the policy which has been maintained by the Society since its inception:—

"The advance of science takes the workers in science more and more beyond the ken of the ordinary public, and their work grows to be a little understood and much misunderstood; and I have felt that the need would come for interpreters between those who are carrying on scientific research and the public in order to explain and justify their work."

The need for interpreters is no less great to-day.

UNDER the auspices of the Institute of Pathology and Research at St. Mary's Hospital a course of lectures on Pathological Research in its Relation to Medicine will be given in the lecture-room of the Bacteriological Department in the coming session at 4.30 P.M. on Thursdays. Among those taking part in the course are Sir James Mackenzie, F.R.S., Professor W. Bulloch, F.R.S., Professor Georges Dreyer, F.R.S., Dr. Leonard Hill, F.R.S., Dr. H. H. Dale, F.R.S., and Dr. J. A. Murray. The principal of the institute, Sir Almroth Wright, F.R.S., will give the introductory lecture on April 28th, taking as his subject Acidosis and Acidæmia, with Special Reference to Scurvy and Shock. The lectures will be open to all members of the profession and to students.

[1] THE LANCET, Feb. 19th, 1921, p. 359.
[2] Ibid., April 2nd, 1921, p. 726.

# MEDICINE IN SOVIET RUSSIA.

By BORIS SOKOLOV,

PROFESSOR OF PROTOZOOLOGY AT THE UNIVERSITY OF PETROGRAD.

[Professor Boris Sokolov was engaged before 1914 in experimental work—notably cultures in vitro of cancer and sarcoma—in collaboration with Professor Metchnikov. During the war he served on the Russo-German front, and in 1917–18 was a member of the Central Committee of the Russian Red Cross and a Deputy to the Constituent Assembly; later he held a post in the Ministry of Education for North Russia. Arrested by the Communist Government for political reasons, he was for some time employed as doctor in the Boutirka Prison, Moscow; upon his release he was enabled to keep in touch with medical and scientific work under the Communist régime. Dr. Sokolov is the author of several medical and political works.]

*Soviet Medical Organisation.*

Before the Soviet organisation came into being there existed in Russia a series of social and semi-social relief institutions—Red Cross, Blue Cross, provincial councils, and city organisations—working more or less independently. The Soviet system is based upon rigid centralisation, and all existing groups have been placed under the control of the Department of Public Sanitation and Hygiene; the entire medical organisation of the country is now in the hands of the State, and the development of bureaucracy has resulted in slackness of administration. The committees which in 1918 were responsible for hospitals and clinics have ceased to exist, having been replaced by commissaries, who act as inspectors and are all members of the Communist party. These commissaries are often chosen from the junior medical staffs, being appointed by political chiefs who know little of their qualifications; their power is absolute, and frequent conflicts with the hospital doctors resulted at first, although the situation is now becoming rather easier. The head of the Department of Sanitation and Hygiene is Dr. Semasko, a cultured and humane member of the Communist party, who lived for many years in Paris; his assistant, Dr. Salonev, is not so acceptable to members of the medical profession.

*Condition of Medical Science in Soviet Russia.*

It is exceedingly difficult to gain a clear impression of Russian medical science during the past few years, mainly owing to the almost complete extinction of medical journals. The *Russian Doctor* and others have ceased to appear, owing to paper shortage and various technical difficulties; publications relating to the work of private institutions, and those dealing with experimental medicine, bacteriology, &c., have suffered particularly. Since 1919 one State periodical, *Scientific Medicine*, has been edited by a literary and scientific group at Petrograd, and six smaller publications have struggled on for two years. Economic conditions generally, shortage of heat for laboratories, lack of animals for experimental purposes, &c., have paralysed scientific activity; the Institute of Experimental Science in Petrograd has completely ceased to function, and those laboratories which are still open can only carry on a minimum of work. Among the latter is that of Professor Pavlov, who in 1920 published an article dealing with the physiology of the large hemisphere. The Institute of Experimental Medicine is still working, but many bacteriological laboratories have been closed. Clinics which in 1918 were noted for research work are now only able to deal with the sick; the only sphere in which research has still been possible is that of epidemic diseases. Typhus exanthematicus has been carefully studied, especially by Professor Ilatogorov at the Medical Institute, Petrograd; by Professor Marzenevsky at the State Institute of Sanitation, Moscow; and by Professor Pletnov at Moscow. The fact that all joint meetings of medical and bacteriological societies have recently devoted their time to the study of typhus sufficiently indicates the present importance of the problem in Russia. Among reports presented at conferences in 1920 the following were of particular interest:—Professor Zarassevitch, "The Present Position of Epidemics"; Dr. Nikitine, "Peculiarities in the Course of Infectious Diseases"; Professor Lioubarsky, "Immunity and Insufficient Nourishment"; Professor Pletnoff, "Pathogeny of Typhus"; Dr. Koutune, "Coagulation of Blood in Typhus"; Dr. Vorobiev, "Viscosity of Blood in Typhus"; Professor Levanov, "Blood Changes in Typhus."

*Experimental Research into Typhus.*

The following are details of laboratory researches into the questions of typhus and other epidemic diseases. These researches were based on vaccination with blood serum; in this connexion I would mention an article[1] by Professor Liotropov. This method of vaccination was used simultaneously by Professor Ilatogorov and Dr. Svachetzev in Petrograd, and Drs. Marzenevsky and Rosenthal at Moscow. Typhus patients' blood defibrinated and citrated was used as vaccine matter (18 c.cm. blood + 2 c.cm. citrate of soda at 2 per cent.). At Moscow Rosenthal's experiments are done in the same way. Marzenevsky used blood serum of typhus patients. The blood mixture used was rendered harmless by heating at 58° C., danger of infection at the time of vaccination being thus removed. In order to give to this vaccine a homogeneous character blood serum from several patients was employed. Professor Ilatogorov's experiments were usually tried on his medical staff; he proved that infection occurred in less than 0·24 per cent. of those vaccinated. Professor Ilatogorov's principal conclusions gathered from his work on preventive vaccine for use against typhus are the following:—

(1) The blood of typhus patients can be used after from 5 to 10 days as an antigen. (2) Patient's blood rendered inactive and defibrinated is harmless when used for injections. (3) Susceptibility to the disease is apparent in one vaccinated person to every five unvaccinated. (4) Vaccination done three times gives the same result as a single vaccination. (5) The initial dose must not be inferior to 5 c.cm. of defibrinated blood. (6) The vaccine matter must be polyvalent.

Conclusions from Professor Ilatogorov's reports on vaccinotherapy in typhus are as follows:—

(1) The blood of typhus patients can be used after from five to ten days of illness as a curative vaccine matter; (2) in vaccinotherapy a quantity of 1–3 c.cm. of defibrinated and warmed blood is used in hypodermic injections, and is repeated from two to three times every 48 hours; (3) the results of vaccinotherapy are generally of a negative kind; (4) the serum of convalescent typhus patients (from 2–12 days after the fall of temperature) can be used as a curative mean; (5) in serotherapy the polyvalent serum is injected subcutaneously in quantities of from 15 to 30 c.cm.; (6) serotherapy gives most encouraging results.

Professor Marzenevsky uses for his experiments blood serum (taken from typhus patients), mixes it with an equal quantity of physiological serum which has been sterilised and heated at 58–60° C. during one hour. He made four injections of this mixture of 1, 2, 3, and 4 c.cm. respectively, making a total of 10 c.cm. of pure serum. These experiments were mostly carried out in the Botkine Hospital at Petrograd; and after experiments with antityphus serum according to Nicolle's method the doctors of that hospital came to the following conclusions, which were reported by N. A. Sokolov:—

"The effect of vaccine matter upon the organism following this method gives unimportant results. Drs. Radzevitch and P. Triodine, in their work 'On the Serotherapeutics of Typhus,' are of opinion that curative vaccine matter obtained from horses gives no local reaction when injected with doses of 25–125 c.cm., and at the same time diminishes the coagulation period."

A report of special interest to epidemiologists is Dr. Schutzer's "Preventive Vaccine Matter for Use against Typhus by Means of Cultivation of the Proteus Bacillus," of which the principal conclusions are:—

(1) The proteus bacillus exists as a constant agent in typhus; (2) The vaccine matter of a killed cultivation of *Bacillus proteus* containing 250 millions of bacteria per c.cm. in a dose of 0·5 c.cm. creates a violent reaction in the organism.

Still more interesting is the work of Dr. I. Sokolov, because it has a certain practical value in the differential

diagnosis of typhus by means of "hypostatic hyperæmia."[2] This writer has come to these conclusions:—

(1) The skin in typhus reacts against venous stagnation; (2) this skin reaction is especially characteristic of exenthematic typhus; (3) in order to produce this "hypostatic hyperæmia" a tourniquet must be applied around the shoulders; (4) the skin in this illness reacts in forming petechiæ from 12 to 24 hours before the appearance of the rose rash.

*Other Research Work.*

Among other work on epidemics should be mentioned Professor Gamalé's "Volatile Vaccine Matter."[3] Compared with the other volatile vaccine matter of cholera, distillation of alkaline solution of cholera vibrios produces immunity about the second or third day instead of about the fourteenth. Besides, although not colloidal, these vaccines can be absorbed by the intestine. Gamalé concludes thus:—

The volatile vaccines produce a real immunity. They are not homogeneous, but their action shows that successful vaccination can take place without either agglutination, precipitation, or formation of bacteriolysins.

Amongst works bearing on conditions under Soviet government those which deal with starvation must not be omitted.

Researches in this direction were mostly done (in the laboratory set apart for the physiology of nutrition in the State Institute of Sanitation at Moscow) by Professor Chaternikov and his assistants, but the interest of the results is more physiological than medical. Some of the work done, however, has a purely medical interest—e.g., Professor v. Dolganov's observations on detachment of the retina as a result of starvation.[4] He has traced the causation of this detachment by observation of a great number of cases.

Looking over the work done during 1919-20 with reference to tuberculosis and surgery, it must be admitted neither of these questions was much studied. The conditions under which medical men have lived have prevented them from undertaking researches of no direct practical value. Clinics and laboratories which are needed by the Government are given a big subsidy, but others are left with no means at their disposal; this is, perhaps, the explanation of the specialised nature of work done during the past two years.

*Relations Between the Government and the Medical Profession.*

The members of the medical profession are the only "intellectuals" whose work has not been interrupted by the communist revolution. They have maintained a neutral attitude in political matters, although anti-communist as a body; hence Dr. Semasko's principal advisers are Professors Zarrasevitch, Diatropov, and Koltzov, all of whom are well-known constitutional democrats—that is, members of a liberal party which was treated with particular severity by the communist government. Doctors in general feel themselves bound to maintain as far as possible the health of the immense population, of which the majority cannot be held responsible for the revolution or its consequences. Twenty-five per cent. of the profession have left Soviet Russia—57 of them are now living at Capri as refugees—but those who remain continue their work with energy and devotion. Professor Koltzov was recently imprisoned for six months for participating in a counter-revolutionary movement; Professor Pavlov was refused permission to leave the country, and an attempt to attach him to the communist party by means of an increased food ration failed; whilst a general expression of opposition to the Soviet power was made by the Medical Conference held at Moscow during August and September, 1920—after which Dr. Semasko, who was present, threatened drastic measures of control. But on the whole, and except for the lack of medical materials and foodstuffs, the medical organisation is up to date and nearly as good as that in force before the war—mainly because the responsible posts in medical affairs are still in the same hands. The communist doctors are very few in number, and most of them more or less inexperienced.

*Position and Life of Medical Men.*

The peculiar conditions of life under the Soviet administration, the continuous civil war, and the wide spread of epidemics, have made the position of medical men very difficult; their political neutrality resulted in many being shot by the Reds, and many others by the Whites. Numerous members of the medical profession are still imprisoned by the Soviets; but after three years of civil war Whites as well as Reds began to appreciate their work and respect their neutrality. Finally, when a doctor was taken prisoner by either side he was immediately required to serve in a professional capacity. The profession has suffered more from epidemics than from persecution or civil war. From Nov. 1st, 1917, till August 1st, 1920, cases of typhus alone were as follows: doctors, 520, with 95 deaths; assistants, 272, with 63 deaths; nurses, 3520, with 927 deaths. During the same period of time 47 per cent. of Petrograd doctors have died; and it would be difficult to find a single doctor or nurse who has not suffered from two or three attacks of continued fever of some form or other. In the spring of 1920 a general improvement of health was noted; Professor Tchistovitch expressed the opinion that by that time the entire population was practically immune. In six months the percentage of persons suffering from some epidemic disease decreased from about 30 per cent. to 10 and even 7 per cent.

Turning to the consideration of economic conditions: when the Soviet power was first established, the greatest strictness was observed in the matter of equalisation of wages, so that early in 1918 experienced doctors were earning little more than their assistants; the result of this state of affairs was that a large number of medical men gave up practice and attempted to earn a living outside their profession. Later, however, they were recruited by the Government and given better rates of payment; those in charge of epidemic diseases were allowed extra food rations, but in spite of all measures taken, the salaries of doctors and trained nurses are still insufficient. Assistant doctors are paid according to category 21, which allows them about 4000 roubles a month; trained nurses receive 2000 roubles; the insignificance of these sums will be apparent when it is realised that a pound of butter costs 5000 roubles. Only by attending private clients and by undertaking lay employment can the Russian doctor manage to live; the "bourgeois" client of pre-revolutionary days can no longer afford the services of a physician, and in many cases doctors treat "professional" clients free of charge. The new class of paying patients is drawn from the communist bureaucracy and the successful speculators. Professor Ov, the celebrated Petrograd gynæcologist, asked 100,000 roubles for a small operation performed upon the wife of Linoviev, a leading communist; and this sum is not at all extraordinary. The Government, fearing that private practice renders medical men too independent, introduced in September, 1920, a regulation whereby the number of private patients is limited; and no doctor may write more than 50 prescriptions for private clients per month. The use of prescription books with numbered pages has been made compulsory, and the measure has naturally caused a great deal of dissatisfaction amongst practitioners.

*Condition of Hospitals and Clinics.*

During my stay in Soviet Russia I visited a number of hospitals and clinics with the intention of discovering whether the condition of these institutions had altered for better or worse; in many hospitals improvements are to be seen, particularly as regards disinfection and sanitation. The constant presence of epidemic diseases has, of course, brought to light new methods of isolation in city hospitals. On the other hand, slack discipline is noticeable amongst the staffs of the civil hospitals. Patients are not uncommonly ill-treated, and delirious cases have even been beaten; and as the doctors have not full control little can be done to stop these abuses.

In August, 1920, I was very painfully impressed by the state of chaos in which I found the Central Infirmary at Moscow. There the rules concerning

isolation were very badly kept, and diagnoses were so superficially made that cases of typhoid and cases of tuberculosis, for example, were to be found in the same ward. At that time I did not notice any great shortage of medicines or surgical apparatus in the large towns, but the provincial "zemstvo" hospitals were being closed for lack of staff and materials. The hospitals in Petrograd and Moscow still had quinine, aspirin, and anæsthetics, but judging from a talk I had with Dr. Semasko, and by figures which I saw, the reserves were then coming to an end. In August only a few kilogrammes of chloroform were left in Petrograd, and all morphia had already been used up. A salvarsan preparation was being sold, but was of bad quality. Surgical instruments were also running short. Figures given by the Department of Health and Sanitation showed that on May 1st, 1920, the allotment of beds was roughly as follows: epidemic cases—civil 250,000, military 250,000; other cases, 500,000.

*Statistics of infectious diseases.*—The statistics given are incomplete, for it is impossible to obtain accurate returns from the provinces, but the estimated number of cases of epidemic disease in Soviet Russia during the past three years stands at the appalling figure of 31,789,230. The average mortality was from 5 to 7 per cent. of that number. The diseases most in evidence were typhus exanthematicus, typhus recurrens, typhoid, cholera, influenza, and dysentery. Cholera broke out in the spring of 1918, there being 35,619 cases during the year; Petrograd, and then the Volga region, suffered most heavily, the mortality in the latter district rising to 60 per cent. The autumn of 1919 was marked by a recrudescence of cholera, but still more deaths were caused by typhus. It is impossible to give figures for the whole of Soviet Russia, as owing to shortage of personnel records were not kept in many provincial hospitals; but the recorded figures showed that typhus began in the summer of 1918, there being 4519 cases in October of that year, 7933 in November, and on July 1st, 1919, the figure stood at 1,299,202 (Siberia not included). From 400,000 to 420,000 persons died of the disease during 1918-20. In some places it was impossible to bury the dead except in communal graves, with no coffins or burial ceremonies; at Saratov a "week of the dead" was appointed, and the entire population had to take part in burying the bodies.

Influenza also broke out in 1918, there being 700,000 cases during the year, with a mortality-rate of 15 per cent. The later incidence of the disease was not so serious. At the same time typhus recurrens spread through large tracts of Central Russia, but in this connexion figures are not available. In the summer and autumn of 1920 epidemics seemed quieter, but there is no reason to suppose they will not break out again; the exhaustion of the populace and unhygienic conditions contribute to the likelihood of their doing so. The living conditions in the towns are particularly bad; overcrowding, and neglect of the most elementary rules of hygiene, are there associated with grave defects in water-supply and drainage.

The Government has brought out a series of posters, urging the population to fight lice as energetically as they have fought the middle classes. "Burn them, kill them, cover them with petrol, iron them!" is the wording of these posters.* Petrograd has in every epidemic suffered more than any other part of the country. Up till August, 1920, the total of cases of influenza and typhus taken together was 202,173.

### *Diseases in Soviet Russia.*

A Russian medical man has humorously said that it is not true that Bolshevik rule brought nothing but evil to Russia, for a certain number of people who once suffered from obesity and chronic catarrhs are cured, and even feeling younger. It is an undoubted fact that many diseases have entirely disappeared as a result of the change brought about by the abolition of idleness. A Petrograd physician told me that of 300 of his patients only 9 suffered from dilatation of the heart caused by obesity; 5 of these were well-known communists and the other 4 profiteers. A new illness has, however, appeared in Petrograd as a result of the eating of badly-cooked wheat. Its symptoms are frequent pains in the right side of the abdomen, general weakness, dizziness, nausea, and distaste for food. Tuberculosis is spreading widely in the towns as a result of the entire lack of fats, and in Petrograd a tremendous increase of lung troubles has taken place. The infirmary at Moscow contained 12 per cent. of tuberculous cases in 1917, and now contains 37 per cent., the general condition of the country especially favouring infection of all kinds.

Bad food has brought about general exhaustion and various forms of anæmia, especially in the towns; the general ill-health is very striking to anyone newly arriving in Russia. Professor Ov has stated that 30 per cent. of women and girls are no longer menstruating because of anæmia and under-nourishment. A very large increase of miscarriages naturally results from present conditions; an assistant at the Gynæcological Institute at Petrograd told me that women are terrified at the thought of bearing a child, knowing perfectly well that if born alive it will in all probability shortly die.

The Government has abolished open prostitution and regulated brothels, but this evil has merely assumed a different character; there are now more prostitutes than before, although Petrograd doctors do not report any increase in venereal diseases.

Patients admitted to hospitals show, on the whole, more carelessness concerning their health, as they realise the difficulty of obtaining proper treatment.

### *Condition of Children in Soviet Russia.*

The gravest effect of recent Russian history is apparent in the younger generation; such, at least, is the view of the "League for the Protection of Children," which is headed by Professor Zarassevitch. Parents are overworked and unable to bring up their children properly; the lack of control is having the most serious results; the actual destruction wrought by the revolution is nothing to the appalling moral degeneracy and criminality among children which now stands out as the foremost evil of modern Russia. At one hospital, where the number of children suffering from venereal disease used never to be higher than 15 per cent., 60 per cent. are now affected as compared with 40 per cent. of adults. Moreover, the children born during the past two or three years in Petrograd and Moscow are weak and ailing on account of under-nourishment. A newborn baby frequently weighs no more than 6 lb., the normal weight being 8 lb. The new generation is being overcome by eczema, anæmia, and rickets, and every doctor in private practice numbers more children than adults amongst his patients.

Those in authority have at least realised the seriousness of the position, and children's hospitals and sanatoriums have been instituted, some by the Government, others by "intellectuals" acting with Government approval. Many of the measures taken have, however, already come too late. The Government consider the time has come for the nationalisation of children; it remains to be seen whether they will dare to put such a measure into operation.

### *Conclusion.*

In this short account of the medical situation in Soviet Russia I have had one aim only, to bring to light, as impartially as possible, the actual state of affairs; the attempt has naturally been painful and the degree of objectivity attained is, perhaps, only relative.

*References.*—1. Liotropov: Journal of Public Sanitation Committee, Nos. 1 and 2. 2. I. Sokolov: Scientific Medicine, Petrograd, 1920. 3. Gamalé: Journal of Public Sanitation Committee, 1918, No. 1. Scientific Medicine, 1920, No. 5. 4. V. Dolganov: Scientific Medicine, 1920, No. 6. Amongst other medical works the following may be mentioned: Dr. Trchernomskoi: Treatment of Tuberculosis by Ultra-violet Rays. Dr. V. Valker: Spanish Grippe. L. Yakobsen: Application of Neo-salvarsan in Syphilis. V. P. Protopopov: Menstruation Troubles in the Psychoses. Prof. Ossifov: Heredity and Psychic Illness. Prof. Kouzneskov: Clinical Study of Spanish Grippe.

* Examples of Bolshevik anti-cholera and anti-smallpox posters were reproduced in THE LANCET, 1920, ii., pp. 619, 620, in the course of a series of articles on "Public Health in Soviet Russia," by Dr. L. Haden Guest. [The articles appeared on pp. 518, 566, 617, and 661 of vol. ii., 1920.]

NURSING AND MIDWIFERY EXHIBITION AND CONFERENCE.—The eleventh annual conference will be held in the Royal Horticultural Hall, Vincent-square, London, S.W., from May 17th to 20th. Suggestions as to subjects or speakers may be sent to Miss J. Prior, Assistant Secretary, 22, Great Portland-street, London, W.1.

## IRELAND.

(FROM OUR OWN CORRESPONDENT.)

*The Position of Poor-law Medical Officers.*

THE position of Poor-law medical officers in certain parts of the country becomes every day more difficult. In unions in which the guardians have repudiated the authority of the Local Government Board the Government grants, from which a portion of the Poor-law salaries was paid, have been withheld. At the same time the Local Government Board still claims the right to dismiss medical officers or to mulct them in costs by process of mandamus if they fail to send the usual returns to the Board. On the other hand, the guardians have the power of withholding a medical officer's salary should he, in disobedience to their orders, send returns to the Local Government Board. The medical officers whose only desire is to continue to do their professional work without interference, find they cannot hope to serve two masters, and are actually performing their usual duties without receiving any salary. Last week a new factor further complicated the position. Several local authorities received a circular letter, purporting to come from the Local Government Department of Dail Earann, containing the following warning:—

"Where a local authority has by resolution declared allegiance to Dail Earann and has severed all relations with the English Local Government Board, instructing its officials to cease communication with that institution, any such communication, written or verbal, direct or indirect, with that institution or any of its officials, or any person acting on behalf of any of its officials, will be deemed a treasonable practice and dealt with accordingly."

I do not pretend to interpret the threat in the closing words of this warning, but to a man living in a country district in Ireland it is not to be taken lightly. Last week the Council of the Irish Medical Association drew the attention of the Local Government Board to the danger to which they were exposing Poor-law medical officers for the performance of what is, under present conditions, a mere formality.

April 17th.

## VIENNA.

(FROM OUR OWN CORRESPONDENT.)

*Statistics of the University Term.*

THE following are instructive items from the prospectus for the coming summer term (April 15th to July 15th). Four hundred and seventy-two classes will be held for ordinary students and post-graduates, as against 448 held last summer term. The number of men engaged in this work is 24 ordinary professors, 135 extraordinary professors, and 157 assistants. These figures differ only slightly from those of the last winter term. Two members of the Senate of the Medical Faculty, the professor of medical chemistry and the director of the first clinic for obstetrics and gynæcology, have not yet been appointed. The published figures show that the number of ordinary medical students is declining somewhat; the present total is 4282, as against 4529 a year ago; female students number 578, as against 600 last year. It is believed that later figures will show a further drop because of the increased fees payable by foreign students in compliance with the demand made by the Rockefeller Foundation,[1] to which I have already alluded.

*American Food Supplies for Students and Scientists.*

The American Relief Committee, which has fought starvation by supplying a free daily meal to about 200,000 children in Austria alone, has now extended the scope of its work to include assistance of the so-called "mensæ." These institutes provide a midday dinner for university students in Vienna, but for many months this meal has been very scanty owing to lack of funds. The Relief Committee has now made arrangements to supply sufficient food for an additional daily meal of the food value of 1000 calories. It will consist of rice, cocoa, butter or fat, sugar, flour, beans, and peas; all students will be entitled to apply for it, with no distinction of race, creed, or stage of study. The professors and lecturers have also a special mensa of their own, where they obtain a good meal at a nominal cost—hardly enough to cover part of the rent. It is intended to compare the weights of the students before beginning the additional meals, and after partaking of them for periods of 4, 8, and 12 weeks.

[1] Vide THE LANCET, April 9th, p. 769.

*Twenty-fifth Anniversary of the Discovery of the Rontgen Rays.*

On March 18th the Medical Society of Vienna held a solemn meeting in honour of the twenty-fifth anniversary of Professor Rontgen's great discovery. A paper was read by Professor Lecher, the famous physicist, on "Physical Aspects of Rontgen's Discovery," in which he explained the use of X rays in ascertaining the number and inner construction of elements and their atoms. He mentioned the splendid work of the English scientist Moseley, who fell when very young in action at the Dardanelles.

*A Peculiar Psychical Condition After Gas Poisoning.*

At a recent meeting of the Medical Society of Vienna, Dr. Geistmann showed a patient in a peculiar condition produced by illuminative-gas poisoning. The condition was characterised by a complete loss of apperception, differentiation, and recognition of objects and occurrences of the outer world—a loss of the functions of thinking, reasoning, and judging, in short, of the higher psychical spheres altogether. The patient's behaviour permits of the assumption that the cortex cerebri, the centre of psychical activity, had completely ceased to function. He displayed an extreme degree of dementia; the very earliest reflex phenomena—echolalia and echopraxis, as seen in infants—were demonstrable in him. When any object was brought near his face he moved his lips as if to eat it, showing suppressive reflexes from the cortex to be entirely absent. He repeated mechanically, without understanding it, any word or sentence spoken to him, and every movement or gesture made before his eyes was at once imitated. His motorial condition reminded one of the primitive forms of movement seen in the lowest animals, although he had retained normal function of the bowels, kidneys, and vascular system. The case seems to be unique, and will be further reported upon later.

*Reform of the Public Health Service.*

The ever-increasing scope of preventive medicine necessitates a reform of the Vienna health service. A special committee has been appointed to draw up the outlines of the proposed reform. The following principles have been agreed upon, and will be recommended to the municipal authorities. All matters pertaining to public health will be centralised in the "Stadtphysicat," controlled by the ober-stadtphysicus (chief M.O.H.); the central office will contain several departments, each with two or more subdivisions, to deal with separate problems such as the following: general direction of sanitation of the city; standardisation of tariffs and schedules in employments; preparation of standard forms for health reports and statistics, milk distribution, and additional fat and sugar rations for diseased persons; control of municipal institutes of health; and instruction of the public health service. The hospitals, and hygiene, bacteriological, and chemical institutes are to be controlled by a special department. Public welfare work, child welfare, care of the tuberculous and the crippled (including war cripples) is to be centralised in another department, which will also deal with inspection of markets and of the sale of medicines. Coöperation with the State Board of Health, which deals with the corresponding work throughout the rest of the country, is, of course, expected, and it is hoped that the reorganisation of this important side of local government will result in permanent benefit both to the ratepayers and to the municipality.

April 14th.

# The Services.

## INDIAN MEDICAL SERVICE.

THE rates of pay and pension have been improved and additional pensions granted for administrative officers of the Indian Medical Service. A communiqué from the India Office says that the reforms will date from Jan. 1st, 1920, showing that the representations of the last 12 months have received a sympathetic hearing.

The position of the Indian Medical Service is well known to all our readers, and the difficulties need not be repeated here. Two Committees, one presided over by Sir Verney Lovett and one presided over by Lord Esher, have sent in valuable reports dealing with the anomalies of the Service, and recognising the political complications which have been introduced. The Service has for many years declined in popularity with the medical profession, and the recent constitutional changes in India have had a further depressing effect. There has been a steadily increasing difficulty in obtaining recruits of the right stamp, but the communiqué from the India Office may be taken as a step towards reform.

The terms upon which officers can enter the Service were set out in full in the last Students' Number of THE LANCET, and have since been repeated in our advertisement columns. They show a great improvement upon previous conditions, and ought to prove attractive.

## ROYAL AIR FORCE NURSING SERVICE.

REGULATIONS regarding conditions of service in the Royal Air Force Nursing Service, which was established by Royal Warrant on Jan. 27th, 1921, have been issued. The Service consists of a matron-in-chief, matrons, senior sisters, sisters, and staff nurses. Candidates are required to join as staff nurses, and appointments, which are subject to a satisfactory probationary period of six months, are given to approved persons of British parentage, over 25 and under 35 years of age, who possess a certificate of training for at least three years at a large civil hospital in the United Kingdom.

*Salaries.*—The salaries of the various grades are as follows:—

Staff nurses: £60 per annum, rising by annual increments of £2 10*s.* to £65.

Sisters: £75 per annum, rising by annual increments of £5 to £85.

Senior sisters: £85 per annum, rising by annual increments of £10 to £95.

Matrons: £115 per annum, rising by annual increments of £10 to £185.

In addition, charge pay, not exceeding £45 per annum, is granted to matrons according to the magnitude of their charges, and a weekly allowance of 24*s.* 6*d.* to all members in lieu of board and washing. Furnished quarters, fuel, light, and attendance are normally provided, but where this is not the case an allowance in lieu is granted. An initial grant of £20 is made towards the cost of purchase of the prescribed uniform which members are required always to wear when on duty and when attending official or public entertainments, and an upkeep allowance of £5 for the second year and £10 for the third and subsequent years.

*Retired pay.*—Members of the Royal Air Force Nursing Service may retire at the age of 50 or after 20 years' service, and retirement is compulsory at the age of 55. Retired pay, based on service and rank, is issued up to the following maximum rates, which are subject to revision in five years' time:—Matrons, £170; sisters, £75; staff nurses, £55. Members employed in the Royal Air Force Temporary Nursing Service and previously employed in the Navy or Army Nursing Service may count the period of such service towards retired pay. A nurse with less than ten years' service will not be eligible for retired pay, but provision is made for the issue, under certain conditions, of retired pay and gratuities in the event of such service being terminated owing to disablement, sickness, or unfitness.

Full particulars of the Service and forms of application for appointment may be obtained from the Matron-in-Chief, Air Ministry, Kingsway, London, W.C. 2.

## ROYAL NAVAL MEDICAL SERVICE.

Surg. Lieut. W. L. Coullie to be Surgeon Lieutenant-Commander.

Surg. Cmdrs. A. C. W. Newport, S. Roach, and G. D. Bateman to *Pembroke*, additional, temporary. Surg. Lieut.-Cmdrs. H. St. C. Colson and G. A. S. Hamilton to *Pembroke*, additional, temporary. Surg.-Lieuts. H. L. Pridham to *Pembroke*, additional, temporary; C. N. Ratcliffe to *Bryony*; and A. G. Taylor to *Sandhurst*.

## ROYAL ARMY MEDICAL CORPS.

Major W. E. C. Lunn relinquishes the acting rank of Lieutenant-Colonel.

Temp. Capt. C. H. Evans relinquishes his commission and retains the rank of Captain.

### TERRITORIAL FORCE.

Major W. A. Thompson to be Lieutenant-Colonel and command 3rd Northumberland Field Ambulance.

Capt. G. C. E. Simpson to be Lieutenant-Colonel and command 2nd West Lancs Field Ambulance.

Capts. A. D. Kennedy, L. T. Whelan, L. A. Mackenzie, J. Turtle, S. J. Fielding, H. W. Symons, and J. Taylor to be Majors.

Major T. P. Cole (late R.A.M.C.) to be Captain, and relinquishes the rank of Major.

Major (acting Lieut.-Col.) L. C. V. Hardwicke relinquishes the acting rank of Lieutenant-Colonel on ceasing to be specially employed.

Capt. C. G. Teall (late R.A.M.C.) to be Lieutenant and relinquishes the rank of Captain.

Capts. A. W. A. Davies, W. H. Kerr (late R.A.M.C., S.R.), and H. V. Walsh (late R.A.M.C.) to be Captains.

Capt. L. T. Challenor vacates the appointment of D.A.D.M.S., 48th (South Midland) Division.

R. E. Pleasance (late Surg. Sub-Lieut., R.N.V.R.) to be Lieutenant.

Officers relinquishing their commissions: Major (Bt. Lieut.-Col.) B. M. H. Rogers and Major W. R. N. Smithard (granted the rank of Lieutenant-Colonel), Majors L. T. Whelan and J. Owen (retain the rank of Major), and Capt. W. E. Kingdon (retains the rank of Captain).

### TERRITORIAL FORCE RESERVE.

Major G. F. Whyte, from General List, to be Lieutenant-Colonel.

## ROYAL AIR FORCE.

Capt. G. W. J. Bousfield is transferred to the unemployed list.

## INDIAN MEDICAL SERVICE.

Captains to be Majors: B. Gale, J. H. Horne, H. H. King, R. E. Flowerdew, J. G. B. Shand, A. J. Lee, C. H. Smith (Bt. Major), T. J. C. Evans, A. C. Anderson, D. G. Cooper, W. L. Forsyth, and G. T. Burke.

Lieut.-Col. R. Steen and Major M. J. Quirke retire from the Service.

The following relinquish their temporary commissions:—Temp. Captains: Amar Singh Dogra, Bantwal Shankar Rau, and Bankim Chandra Banerjee. And are granted the rank of Captain: Sant Singh Duggal, Ramakrishna Venkata Rajam, and Ram Chandra Bose.

# URBAN VITAL STATISTICS.

(Week ended April 16th, 1921.)

*English and Welsh Towns.*—In the 96 English and Welsh towns, with an aggregate population estimated at 18½ million persons, the annual rate of mortality, which had been 13·0, 13·0, and 12·5 in the three preceding weeks, was again 12·5 per 1000. In London, with a population of 4½ million persons, the death-rate was 12·4, or 1·0 per 1000 below that recorded in the previous week, while among the remaining towns the rates ranged from 3·4 in Ealing, 5·9 in Walthamstow, and 6·5 in Dudley, to 18·3 in Bath, 20·3 in Merthyr Tydfil, and 23·8 in Eastbourne. The principal epidemic diseases caused 241 deaths, which corresponded to an annual rate of 0·7 per 1000, and comprised 62 from diphtheria, 59 from infantile diarrhœa, 58 from whooping-cough, 50 from measles, 9 from scarlet fever, and 3 from enteric fever. Measles caused a death-rate of 1·0 in Sunderland, 1·6 in Newcastle-on-Tyne, and 2·9 in West Bromwich. The deaths from influenza, which had been 122, 130, and 97 in the three preceding weeks, rose to 111, and included 49 in London and 5 each in Brighton and Liverpool. There were 3345 cases of scarlet fever and 2543 of diphtheria under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital, against 3453 and 2626 respectively at the end of the previous week. During the week ended April 9th 6 cases of encephalitis lethargica were notified in the County of London, and comprised 2 in Hampstead, and 1 each in Chelsea, Hackney, Islington, and Stepney. The causes of 26 of the 4436 deaths in the 96 towns were uncertified, of which 10 were registered in Birmingham, and 2 each in London, Gillingham, Liverpool, and Warrington.

*Scottish Towns.*—In the 16 largest Scottish towns, with an aggregate population estimated at nearly 2½ million persons, the annual rate of mortality, which had been 15·3, 15·5, and 15·1 in the three preceding weeks, fell to 14·6 per 1000. The 328 deaths in Glasgow corresponded to an annual rate of 15·5 per 1000, and included 32 from whooping-cough, 6 from infantile diarrhœa, 5 each from scarlet fever and diphtheria, and 1 from measles. The 123 deaths in Edinburgh were equal to a rate of 14·4 per 1000, and included 10 from measles, 3 from whooping-cough, and 1 each from scarlet fever and diphtheria.

*Irish Towns.*—The 130 deaths in Dublin corresponded to an annual rate of 16·0, or 3·0 per 1000 below that recorded in the previous week, and included 4 from infantile diarrhœa, and 1 each from enteric fever, whooping-cough, and diphtheria. The 130 deaths in Belfast were equal to a rate of 16·1 per 1000, and included 7 from whooping-cough, 3 from infantile diarrhœa, and 1 from measles.

# Correspondence.

"Audi alteram partem."

## THE ULTIMATE SUFFERERS.

*To the Editor of* THE LANCET.

SIR,—The present crisis is hitting the mothers and babies very hard. At some of the centres I attend there is already a very marked difference in the appearance of both. It would be easy to pick out from about 30 mothers at one centre those whose husbands are out of work. When I returned after a holiday I was shocked to see so many thin grey faces and so many flabby babies.

The doctor orders glaxo, virol, or cod-liver oil, but few can afford to take it. There is no fuss made and no cadging; it depends entirely on the sharpness of my lookout whether they go off without their glaxo, &c., or whether I can catch them and make my price fit as nearly as possible to their needs. This last, of course, depends on the generosity of those who send special subscriptions for this purpose. My experience now is, as always, that the mothers rise to the occasion, making the very best of a very bad situation. I overheard one mother of a large family say, "Oh, yes, they gave me a beautiful tonic at the hospital, but I'm afraid to take it, it makes me so hungry."

I have this morning waited for 1½ hours in a queue for my coal permit. There were about 100 women there, most of them with babies, and it was bitterly cold. There were the usual fun and chaff, but I cannot help feeling that under it all the women's courage is nearly at breaking point. It has gone on so long; during the war they stuck to it, counting the weeks till peace came, and now it seems to have no end. A few are bitter, most are deadly patient. I say deadly, because that is what it really is.

I am, Sir, yours faithfully,

April 18th, 1921. TRAVELLER.

## THE COLONIAL MEDICAL SERVICE AS A CAREER.

*To the Editor of* THE LANCET.

SIR,—In Sir James Kingston Fowler's address to the students of the Middlesex Hospital on the advantages of the Colonial Medical Service, published under this title in your issue of April 9th, in his remarks on the Kenya Colony, he referred aspirants for service in that colony who desired further information to three very admirable and charmingly written books by three eminent medical men recording their impressions. The scope of these three books, and the attitude of their writers, is very sufficiently indicated by their titles. Sir John Bland-Sutton's is one which could well be in the library of every East African medical officer for the accurate and interesting information with which it is packed. The other two are more evanescent in character. In a young colony which is struggling very hard to evolve itself, the changing conditions which take place from six months to six months are simply unbelievable except to those who have experienced them. It seems, therefore, somewhat of a pity that the official propagandist of the Colonial Office can do no better than refer to books published some 10–11 years ago. As to what we are now asked to believe, I quote the following from Sir Frederick Treves's book, p. 103:—"The country is healthy. There are no mosquitoes, and no malaria. There is no prevailing disease"—an amazing statement, which, at the time the book was published, occasioned no little comment in our small medical world. The hold certain endemic diseases had on the country was well known to us at the time; while the potentialities of others—which subsequent years' experience have proved—were always before us.

The Colonial Office and the local Administrations of the different colonies are yearly in receipt of annual medical reports, special reports, and investigations on every occurrence affecting the health of the community; of which nothing more is heard. Without claiming an unassailable accuracy for the facts and figures supplied, it seems to me that the time has now come when the Colonial Office might well consider the propriety of collating all these reports for the last five years by a competent editor, under the heading of each colony. If such a handbook was published every five years—the Germans did it for their East African possession—it would be invaluable as a permanent book of reference, as a record of the health progress of the colony; and, finally, it would go far towards determining the relative position to be assigned to each colony for climate and health.

I am, Sir, yours faithfully,

A. D. MILNE,
Late P.M.O., Kenya Colony.

Addison-road, Kensington, April 16th, 1921.

## DELAYED REPORTS.

*To the Editor of* THE LANCET.

SIR,—THE LANCET has always taken such great pains to ensure accuracy in its editorial columns, and statements contained in them are therefore looked upon as absolutely reliable, that I must ask you to allow me to point out a very important exception. In the issue of April 16th, p. 819, you say that the medical officer of health for the county of Gloucester deplores the failure of subordinate health officers punctually to submit their sectional reports. A medical officer of health of a district is not a subordinate health officer and is not so described by the medical officer of health for Gloucestershire. He does not even make a report either to the county council or to the county medical officer of health. He reports to the district council which he serves and is required to send a copy of that report to the county council.

No one deplores the delay in issuing their reports more than the medical officers of health of districts. But what is the reason for the delay? In the case of whole-time officers it is the fact that, with one or two exceptions, the whole of the clerical work of his appointment has to be undertaken by the medical officer of health himself. Unlike the medical officer of health of a large town or of a county, he has not even an office provided for him, much less a staff of secretaries, clerks, and office-boys. He has to keep his own records and make his own returns. His correspondence must be written with his own hand, and he himself must keep a registry and file away documents. I have before me the annual report of one of these medical officers of health covering 120 printed pages foolscap and another 130 pages royal octavo, each with many tables. The mechanical labour of writing these pages for the printer, even by an expert clerk, would take many days. But it has to be done by the medical officer of health at odd moments which he can spare from his routine work. For years the medical officers of health concerned have been clamouring for the removal of this disability, and if the Ministry of Health, who also "deplore" the delay in the issue of the reports, and county medical officers of health instead of deploring would take the obvious steps to effect a remedy some good might accrue.

I do not like a *tu quoque* retort, but the temptation in this instance is too great to be resisted. Dr. Martin's report to the Gloucestershire Education Committee as school medical officer consists of 18 pages (including the title-page and index) and 12 tables, demy octavo. This report is dated May 28th, 1920, and I do not suppose Dr. Martin does much actual clerical work.

I am, Sir, yours faithfully,

Hereford, April 16th, 1921. HERBERT JONES.

*** The question, as so often, is one of terminology. Dr. Herbert Jones is right, but are we wrong? It is true that the district medical officer does not report direct to the county medical officer, but he has to forward to the county council a copy of the report made to his own authority. To this extent, surely, the county officer is suzerain to the district officer.—ED. L.

## CONGENITAL SYPHILIS.

*To the Editor of* THE LANCET.

SIR,—The discussion recently held by the Royal Society of Medicine upon the subject of Congenital Syphilis has brought before us the marked differences of opinion with reference to the incidence of the disease and the need for further research and investigation, both in the laboratory and at the clinic. Many of us, and especially those who are engaged in children's work, have been much concerned to know the amount of mortality and morbidity due to congenital lues amongst the child population. While, on the other hand, there are those of us who believe that syphilis is a considerable cause of abortion, miscarriage, still-birth, and death within a few weeks of birth; and while we also recognise that syphilis manifests itself only too frequently during the early months and years of life, yet the evidence presented to us by the examination and care of large numbers of sick infants and children does not appear to support the suspicion that any considerable amount of mortality or ill-health is due to this cause. On the other hand, there are others actively engaged in the same kind of work—especially, I think, lady doctors—and equally imbued with the importance of arriving at the truth, who think differently, in that they are convinced that quite a considerable amount of mortality and morbidity throughout infancy and early childhood is due to congenital syphilis. One was therefore relieved to see from the Report of the Proceedings that the majority of the speakers did not support the views of those who believe that congenital syphilis is an important and frequent cause of mortality and morbidity during later infancy and childhood. While all of us realise the importance of free and open discussion, without at the same time committing ourselves at this stage to anything in the way of a definite opinion, yet many have viewed with concern the suggestions put forth in the medical journals that diseases and conditions, up to the present not considered to have a syphilitic basis, are after all due to the evil results of the disease. We are open to persuasion and proof. We meet with much persuasion, but the proof in the form of sound reliable scientific evidence appears to be small.

The Wassermann test in the hands of some workers appears to be sweeping into the net all kinds and conditions of disease. The results of the test in the hands of different pathologists are, however, so contradictory that one would challenge at once the advisability of allowing the test to stand as a deciding factor at the present state of our knowledge. All I think will agree that in the presence of active infection the test may be of the greatest value. During the secondary stage of adult syphilis its value is unquestionable, but in the early and late stages its value as a deciding factor is almost nil. As a test for congenital syphilis we have it on good authority that it may be negative in the early weeks, during the active manifestations of the disease it is positive in the large majority of cases, while in the later stages of the infection in childhood its value as a deciding factor again very considerably diminishes. Herein lies a difficulty. The fact that some of us believe that congenital syphilis is a comparatively infrequent disorder, but are at the same time willing to acknowledge that the test in the early and late stages is frequently negative places us in considerable difficulty when we endeavour to combat the suggestion that many disorders and defects considered in the past to have no relationship to syphilis are, after all, due to the disease, although not necessarily an active manifestation of it. We have from time to time been urged to seriously consider the proposition that mental deficiency, epilepsy, spastic paraplegia, pluriglandular insufficiency, nephritis, and, indeed, most of the disorders of infancy and childhood which possess an unknown ætiology may be due to syphilis. I have been asked to believe that "beading" of the ribs during the early months, bossing of the head, craniotabes, thickened skull, a posterior fontanelle which refuses to close by the sixth week, a fontanelle which closes too quickly, ridging of the sutures, enlargement of the liver, anæmia, hydrocephalus, congenital heart disease, and any conceivable thing that I am unable sufficiently to explain, are due to congenital syphilis. When I say that the blood is negative, that there are none of the usual manifestations of the disease present, and that the family history is clear, I am told that a negative Wassermann between the age of two weeks and two years is nothing to go upon, that the absence of the usual manifestations is quite common, and that the family history is rarely reliable because so much is forgotten or kept back by parents who are always out to fog the doctor. Naturally, I am a little nonplussed. I am asked whether I have tried a provocative dose of salvarsan, and when I answer that three gentlemen in America tried the intravenous injections of salvarsan upon non-syphilitic patients with a previously negative Wassermann reaction and obtained a positive reaction in more than 50 per cent. of the cases, the answer is received that surely if this is so I should try it on children and be convinced.

One decides to keep an open mind, and, taking mental deficiency as a test case, I try to find out its relationship to syphilis. I have a feeling that quite likely syphilis may have had something to do with it, and am impressed by the statements of Sir Frederick Mott as given before the Royal Commission on the Care and Control of the Feeble-minded (Vol. I., p. 453), but I also find that the Wassermann reaction used as a test by different workers in connexion with mental defect has given results which vary between 1·5 per cent. and 60 per cent. positives.[1] In the series showing the highest percentages cases are included where the parents or other members of the family have been found positive. The clinical examination of some 70 odd cases of mental deficiency under my care at the Meanwood Park Colony does not support the belief that many of these cases have suffered in the past with the disease. Except in two or three possible examples, the usual signs of lues tarda are not found. I note, however, that the family history of the patients provides many examples of mental instability in the parents.

Taking epilepsy in more detail, the blood test was performed on some 120 cases attending my epileptic clinic at the Leeds Public Dispensary, and 25 per cent. of the cases are returned as positive. Examination of the positives shows that several of the strongly positives are frankly syphilitic, with the general make-up of cerebral syphilis or congenital general paralysis. Some of the positives are described as "slightly positive," and experience with medical out-patients and at a venereal clinic has profoundly shaken my faith in the "slightly positive" result. Excluding the obviously syphilitic type of case amongst the epileptics, and excluding these very questionable "slightly positive" cases I am left with a positive percentage of 16. I find also that a 7·4 percentage was found amongst 418 adult epileptics.[2] I am then reminded of the fact that Dr. Paul Fildes reported to the Royal Commission[3] that approximately 8 per cent. of 1002 out-patients attending the London Hospital were found positive, no patient being included who came to the hospital for reasons connected with syphilis. To complete the picture I take careful note of the parents' and grandparents' reproductive histories. Excluding all those cases that have given positive results I find that in the immediate families 154 infants were lost out of 597, a proportion of 1 in 3·8. In considering the infant loss in the families of the grandparents I take the family on the paternal or maternal side that shows the greater infant loss, arguing that if the disease has been passed down it will most likely have been so from the side showing the greater death-rate. In this way it is found that 274 infants were lost out of 663, a proportion of 1 in 2·4. One was therefore hopeful that evidence had been found suggesting that epilepsy may possibly be a third generation manifestation. Before jumping to conclusions I decide to examine the family histories of controls—patients not suffering with epilepsy or syphilis from the clinical standpoint. Fifty-six controls

[1] Mental Defective Children, Shuttleworth and Potts, p. 95.
[2] Final Report, Royal Commission, Venereal Disease, p. 17.
[3] Final Report, Appendix XII., p. 139.

show a loss of 73 infants amongst 336 brothers and sisters, a proportion of 1 in 4·6, and a consideration of the families of the grandparents and again taking the heavier mortality side, I find that 128 were lost out of 324, a proportion of 1 in 2·5.

Dissatisfied and unconvinced, I turn again to the infant, and especially to the infant suffering from convulsions, "consumption of the bowels," marasmus, hydrocephalus, or mental defect—the type of child that died in the family of the grandparents—and I examine it both from the point of view of the blood and for any history or manifestation of active syphilis, and my results, with few exceptions, are consistently negative. As one amongst others who is merely desirous of arriving at the truth, I welcome any expression of opinion or investigation which will help to elucidate the difficulty, but I am reminded of the fact that many years ago the profession began to make themselves believe that large numbers of children were suffering from scurvy, which had at that time begun to be talked about and investigated, and therefore I am alarmed lest we should allow ourselves to exaggerate unduly the importance of syphilis as a cause of the diseases and defects of present-day infants and children.

I would, therefore, earnestly put forward a plea that we should refuse to accept any figures or statistics that are not supported by weighty clinical and pathological evidence. If congenital syphilis is really more prevalent than most authorities have dreamt of in the past it is clearly of first importance that it should be proved so, and that we should act accordingly. If, however, we are taking a too pessimistic and exaggerated view of the situation let us carefully avoid the danger of misleading the public into the same exaggerated belief.

I am, Sir, yours faithfully,

Leeds, April 14th, 1921. C. WILFRED VINING, M.D.

## THE FIGURES OF VENEREAL DISEASE.

*To the Editor of* THE LANCET.

SIR,—In THE LANCET of April 2nd I drew attention to a statement made by Lord Knutsford in the House of Lords that "at the London Hospital alone they had 23,000 new cases of V.D. last year." He added that the figures of V.D. in this country were almost too great to be believed, in which opinion I fully concurred; in fact, I should be inclined to omit the word "almost."

In your issue of last week Lord Knutsford corrects his original statement, says that he misread his brief, and that the increase of 23,000 was at the London hospitals, not at the London Hospital. Here, again, there appears to be some inaccuracy in Lord Knutsford's figures, for the total number of *new* cases in attendance at the V.D. clinics at the London hospitals was in 1919 28,265 and in 1920 31,046, which shows an increase of 2781 for last year. Of these new cases 5118 were diagnosed as not suffering from V.D. in 1919 and 6592 in 1920, so that if these cases are deducted the total increase last year amounted to 1307.

It is to be hoped that later some information will be given as to what the figure 23,000 was really meant to allude. My own impression is that owing to the "very energetic propaganda" carried out by the N.C.C.V.D. the incidence of these diseases is now declining, in confirmation of which opinion I may state that at the London Lock Hospital there has been a falling off in the first quarter of this year of 569 new patients and 994 attendances in comparison with the corresponding quarter in 1920.—I am, Sir, yours faithfully,

J. ERNEST LANE.

Queen Anne-street, W., April 18th, 1921.

*To the Editor of* THE LANCET.

SIR,—In the *Daily Telegraph* of March 17th last Lord Knutsford is reported as having said, in a speech which he had made on the previous day in the House of Lords, that there were at the London Hospital 23,000 new cases of venereal disease last year. In THE LANCET of April 16th Lord Knutsford admits that he has made a mistake, and that the figure of 23,000 refers to the London hospitals and not to the single institution of the London Hospital.

The figure of 23,000 having been corrected, may I venture to draw your attention to the term "new cases"? All those who have any dealings with hospital "new cases" know that such a description may bring into account cases of the following nature:—

1. Cases which, having attended the previous year, are still under treatment the following year—i.e., cases which, having attended (e.g., in 1919), are still being treated in 1920.

2. Cases which, having previously attended one institution, now attend at another, and are possibly drifting on to yet another.

Further, in my experience, cases are sent up to the various clinics concerned in the treatment of venereal disease, which are not venereal. I venture to state that if the term "new cases" includes cases coming under the above descriptions the figures of incidence of venereal disease may be reduced below even the 23,000 at the London hospitals.

I am, Sir, yours faithfully,

RALPH THOMPSON.

Queen Anne-street, W., April 18th, 1921.

## HERPES OR CHICKEN-POX?

*To the Editor of* THE LANCET.

SIR,—As the relationship between herpes zoster and chicken-pox is at present attracting some attention the following case may be of interest.

E. L., male, aged 31 years, complained of pain in the left buttock and extending down to the knee. It was dull and constant in character, and was becoming worse since its onset two days previously. There were no physical signs, and the patient was given salicylate of soda. Two days later he noticed a rash on the buttock. The pain in the leg was less, but it still felt sore. However, the patient felt ill and giddy, and was sweating. He also noticed a few spots in his mouth and on his chest. The next day there were more spots on his chest and some on his face.

When he was seen again, the rash extending in a scimitar-like form over the middle third of the buttock proved to be herpes zoster, while the generalised rash was chicken-pox.—I am, Sir, yours faithfully,

W. G. VERNIQUET, B.Ch., M.R.C.S.

Kingsbridge, Devon, April 13th, 1921.

## THE ÆTIOLOGY OF SUBPHRENIC ABSCESS.

*To the Editor of* THE LANCET.

SIR,—In his clinical lecture on Subphrenic Abscess, published in THE LANCET of March 19th, Mr. C. H. Fagge speaks of the limitation of the disease being due to "a former localising peritonitis." This statement may be frequently true, but when engaged in pathological work the formation of a subphrenic abscess used to appear to me to be a remarkable illustration of the wonderful power of the great omentum to form adhesions, while the peritoneum covering the viscera may not be able to react to irritation in any other way than to produce pus.

In the case of a perforating gastric ulcer on the anterior surface of the stomach near the lesser curvature, if the escape of the contents should not be too rapid, inflammation spreads slowly over the surface of the stomach until the great omentum attached to the lower border of the viscus is reached. Adhesions are there formed between the omentum and the abdominal wall, arresting the downward spread of the inflammation. The spread to the right is prevented by adhesion of the omentum to the lower border of the falciform ligament, while adhesions in the neighbourhood of the spleen prevent leakage in that direction. A closed cavity is rapidly formed, bounded by the portions of the abdominal wall and diaphragm in front and above, with the left lobe of the liver and the anterior surface of the stomach below. The peritoneum covering these surfaces, instead of forming adhesions, secretes pus, and the abscess is formed.

In the case of a subphrenic abscess following appendicitis again it is the great omentum which limits the disease. The inflammation travels upwards on the

outer side of the ascending colon, and its course is watched and directed by the great omentum, which gives rise to adhesions between the ascending colon and the abdominal wall. Eventually the inflammation reaches the liver. It may there form an abscess below the liver, limited in its spread to the right by adhesions of the great omentum to the lower border of the falciform ligament, but although pus may first collect below the liver, the inflammation generally spreads above also, and a subphrenic abscess to the right of the falciform ligament makes its appearance.

I am, Sir, yours faithfully,

Norwich, April 14th, 1921. THEODORE FISHER.

## LIGHT AS A REMEDIAL AGENT.

*To the Editor of* THE LANCET.

SIR,—Your remarks, under this title, associated with my name, in the issue of March 19th, p. 603, have caused me considerable pain and annoyance. They have been copied in many daily and weekly newspapers, and unfair and foolish comments have been made. I have received many letters upon the subject, mostly abusive. I am not astonished at the lay press taking the matter up, for you have done your best to make me appear ridiculous.

Your opening remark is incomprehensible, what you mean by "gracious to say it" I fail to understand. You then say that I had the courage to denounce sunlight as a "harmful agent in the human economy." Your source of information is a typescript which I sent to you last October, which you had in your possession when you accused me of denouncing sunlight. My denunciation reads as follows:—

"Sunlight is the most powerful agent under which we survive. If it were completely withdrawn vitality would cease; its varying quantity reaching the earth has an exact relation to the earth's vitality. In parts of the earth whose sunshine is regular and abundant great fertility, human and vegetable, prevails, and where it is less regular and less abundant relative sterility prevails. Where it is seasonal, as in the temperate climes, fertility is coincident with its greatest amount. The gradual increase in the amount of sunlight in the springtime is coincident with rutting in animals and germination of the seeds in the earth. Delay in its reception retards both conditions, and early reception forwards both.

Animals and plants are conscious of its over-exhibition, and only those which possess some protective power are able to survive. Animals which by their volition remove their bodies from its excessive influence, or which possess some protective skin reflex acting automatically, are able to use its power to their advantage, whilst stationary life defective in power of changing its transparency withers and dies."

I contend that this is common knowledge and that to make such a statement requires no courage, nor is it a denunciation. Had I quoted the classical example of the survivors of the Sicilian expedition as you suggest I should have displayed my ignorance of anatomy and of the physics of the higher frequencies of the solar radiations. You say:—

"Dr. Holt regards sunshine as a cause not only of sunstroke, but of anæmia, chorea, and poliomyelitis, and standing in special relation to such epidemic diseases as typhoid, measles, and scarlatina."

The term sunshine as applied to my argument is a lax one, and is not once used by me in the argument. It occurs when I say "whose sunshine is regular and abundant." With regard to sunstroke, anæmia, and typhoid, there is no evidence in the typescript supplied to you that I regard sunshine as their cause. Sunstroke and typhoid appear (along with 20 other names) on a printed paper supplied to each of the attending members as "Conditions suggested as having an intimate relation to excesses of sunlight." Anæmia does not appear in the list.

The remark which appears in the typescript concerning chorea is as follows:—

"Chorea is a disease occurring frequently in young children, especially in the spring (Osler says that relapses occur in the spring, and I think the same is mentioned in most text-books), at the time when the chemical frequencies are abundant."

Referring to poliomyelitis I say:—

"I hope you will see that the view running through this paper is that nervous disorders *may* be due to electrical action of the solar radiation upon the electrons of the central nervous system conveyed through the terminal nerves and it is in this way that I suggest poliomyelitis arises."

My regarding measles and scarlatina as having a special relation to sunshine is based upon the following:—

"Measles and scarlatina present a curious problem. They are largely summer diseases, known to be infectious, yet in both these illnesses the whole of the skin, including the face and hands, becomes suddenly opaque to the chemical frequencies of light. This is worthy of study."

You misquote me, "admitted during the daytime," I referred to *severe* accident cases *conveyed in an open ambulance*. Your reference to the tuberculosis cases is neither fair nor exact. I say that—

"Our cases demand a scientific hygiene adapted to each individual. ..... Patients have lost superficial fat, the skin has become thinner, the blood anæmic, and the condition is one highly susceptible to the chemical energies of the sun. Therefore the sun must be applied to them with the highest degree of refinement; they react to it quickly; a proper dose is beneficial, an overdose fatal. ..... The Daylight Saving Act when it *first* came into operation caused nearly all my dispensary patients to lose from one-thirtieth to one-fortieth of their body weight during the first three weeks. Many recovered after the first month, but it was fatal to a few."

Your sense of humour is peculiar when you find delightfulness in my manner in making the following observations:—

"The proof that a fair skin transmits the visible frequencies is shown in the transillumination of the face and the comparative transparency of the hands on bright summer days. Dirty hands are not so transparent as clean hands. This may be the explanation why young children dislike being washed. Mothers say that their children are never so happy as when they are dirty. Direct sunlight does give pain to certain skins, and even indirect sunlight gives considerable pain to the dermis when denuded of its epidermis. My own experience in dressing extensive burns taught me this fact very early, compelling me to postpone dressings until evening and then only by candlelight."

"The malignant rays of the sunlight" does not appear in the typescript. The expression is one I do not precisely understand; I suspect it is intended to be sarcastic. If it is sarcastic it shows a lack of sympathy with young children.

The principal object of my paper is to call attention to the possible misuse of sunlight for young children and for patients who are more or less at our mercy, and had I not seen such misuse, entailing considerable suffering, I should not have taken the trouble to compile a paper on the subject. It is a common experience to see babies exposed to a brilliant sun whilst the attendant, who has an older and better developed skin, shades herself with a broad-brimmed hat or a parasol. Patients frequently cover their heads with the bedclothes and some hide themselves under the beds to escape the sunlight. Surely an appeal to save such suffering is unworthy of ridicule.

In your criticisms you fail to note what I consider to be my strong points—viz., the occurrence of epidemic diarrhœa and nervous disorders in young children at the time when their pigmentary protection is most deficient, and their powers of seeking the shade are non-existent. Finally, I may remark that it is inconsistent with ordinary intelligence to consider that the most powerful agency under which we survive is harmless under all conditions, and equally beneficial to everyone irrespective of integumentary power of reception or protection.

I am, Sir, yours faithfully,

R. CRAWSHAW HOLT, M.D. Durh., M.R.C.P. Lond.

Didsbury, Lancs., April 11th, 1921.

*** We are happy that our readers should learn Dr. Holt's views in his own words. If we do not wholly agree with those views we may none the less express regret at the personal annoyance which the criticisms have brought on him.—ED. L.

# Obituary.

## HENRY BARNES, O.B.E., LL.D. McGILL, M.D., F.R.S. EDIN.

Dr. Henry Barnes, whose death at Carlisle on April 12th we briefly recorded last week, held a long record of distinguished service for his profession and in public life. Born in 1842 near Wigton in Cumberland, graduating with honours at Edinburgh University in 1864, he settled in Carlisle in 1866, holding his first public appointment as physician to the Carlisle Dispensary. In 1873 he was appointed honorary physician to the Cumberland Infirmary, where he became chairman of committee and finally a president, devoting to this institution the energies of a long life. His organising ability was freely expended in collecting funds for the extension and improvement of the building, in which his professional and social gifts, freely bestowed, made him beloved and respected. During the war Dr. Barnes acted as honorary secretary and treasurer to the Cumberland Branch of the British Red Cross Society, showing himself a discerning administrator. His public spirit found scope in his work as county magistrate from 1889 on, becoming chairman of the Cumberland Ward Justices from 1904. He was no mean antiquarian and archæologist; his contributions to scientific literature comprised papers on Roman Medicine and Practitioners, Roman Medical Inscriptions in Britain, and Hadrian's Wall. As President of the British Medical Association in 1896 he gave a notable address on the Medical History of Carlisle. His retirement from practice did not curtail his efforts for the public good, and he will long be remembered in Carlisle as one who served his fellows. Dr. Barnes married in 1873 Emily Mary, daughter of Thomas Barnes of Bolton, and is survived by his widow, a son, and a daughter.

## PETER THOMAS DUNCAN, M.D., B.S. LOND.

Dr. Duncan, of Croydon, whose sudden death on Wednesday, April 6th, was recorded in the last number of THE LANCET, was one of the best all-round practitioners of his day. As a student at University College Hospital he distinguished himself highly among strong competitors; the London University honours lists of that time reveal a contest of stalwarts, and Duncan's name occurs again and again among them. In 1874 he graduated M.B. with honours, and on the same occasion took the gold medal at the B.S. examination. He qualified again for the gold medal when taking his M.D. two years later. He was appointed physician's assistant at University College Hospital, and later was elected to a Fellowship of the College. After a short period of general practice elsewhere, Duncan joined Dr. H. J. Whitling at Croydon in a partnership, of which he afterwards became the head, and he was chiefly responsible for an organisation among a group of practitioners which allowed free scope to their several specialist experience. Duncan himself became physician to the Croydon General Hospital. He was secretary of the East Surrey District of the British Medical Association from 1885 to 1893, and in 1897 was President of its South-Eastern branch. In and around Croydon he held the regard and confidence alike of his fellow practitioners and of the public. His diagnosis, especially in cases of cardiac, circulatory, or pulmonary disease was very sound, and in the difficult problems of prognosis he was surprisingly accurate.

An intimate friend and colleague writes thus of Dr. Duncan: "Much of his success as a leader of a group of men was due to his practical business qualities, knowledge of human nature, and shrewd foresight. It might have been said of him: 'He read much. He was a great observer, and he looked quite through the deeds of men.' Had Duncan chosen the law for his profession he might have made a first-class judge, for he had a singularly judicial unbiased mind. He obtained loyalty from his colleagues of an unvarying kind, due to his personal charm securely based on sincerity, freedom from affectation, and from professional jealousy. The degree of conscientious care that he bestowed upon his patient was a reflex of a high standard in work cherished to the end of life."

Dr. Duncan leaves a widow, a son, and three daughters to mourn their sudden loss, and a very large circle of patients and friends will miss him sorely. His brother, Dr. William Duncan, gynæcologist to the Middlesex Hospital, predeceased him.

## PETER TYTLER, M.D. ABERD.

Dr. Peter Tytler, whose death occurred, at the age of 72, on April 9th at his residence in Withington, was for over 40 years a familiar figure more especially in the Ancoats district of Manchester. Brought up at Tyd-Mar in Aberdeenshire, he was the last male member of a family that had lived there for three centuries. Proceeding to the University of Aberdeen, he took the degrees of M.B. and C.M. in 1872 with highest honours and the M.D. in 1875. After graduating he acted as resident medical assistant at the Royal Asylum, Aberdeen. He came to Manchester in 1876, and by energy and assiduous attention to his patients acquired a substantial practice. After a time he was appointed an honorary surgeon at Ancoats Hospital, a position which he held until ill-health compelled him to resign in 1916, when he elected to reside in Withington. A tall and striking personality, his figure was well known, and his many good and unobtrusive deeds were highly appreciated by the community in which he spent his active existence. In spite of the physical impairment of his health which led to his retirement, Dr. Tytler retained his bright and cheery disposition and remained mentally very active.

## FREDERICK J. BURMAN, M.R.C.S., L.R.C.P. EDIN.

THE tragic death of Dr. F. J. Burman removes a very well-known figure from the South Yorkshire district. Whilst cycling to visit a patient on Friday afternoon he was accidentally knocked down by a motor-car and died from the effects a few hours later. Born at Wath-on-Dearne, he succeeded to the practice which his father and grandfather had held before him. He had seen his native place change from a quiet, picturesque country town to a busy industrial centre at the heart of the South Yorks coal-fields, and his interests had extended to everything which could promote its welfare. In addition to a large general practice, in partnership with Dr. T. Crowley, he was medical officer of health for the district, and had charge of the Fever Hospital. He was also an active member of the staff of the Mexborough Montague Hospital, where, indeed, he passed away after his accident. He was particularly interested in ambulance work and was known over a wide area as an authority on the subject. His help as a judge in prize competitions was largely sought, and he had arranged to occupy this position in the annual competitions amongst the South Yorkshire Colliery teams which were held the day after his untimely death. Kind-hearted, unselfish, and modest, he was a practitioner of the best type, and his loss will be deeply felt over a wide area.

## ALFRED ERNEST WILLIAM RAMSBOTTOM, F.R.C.S.I., M.D. DURH.

THE Hon. A. E. W. Ramsbottom, late Administrator of the Orange Free State, died in London, where he was doing special post-graduate work, on April 16th, as the result of heart failure after a severe operation. Born at Grahamstown in 1860, he was educated first at Bloemfontein and then at Dublin where, after a brilliant career as a medical student, he qualified in 1882, becoming F.R.C.S.I. in 1896. He obtained the M.D. Durh. in 1902. On returning to South Africa he practised first at Fauresmith and afterwards at Bloemfontein. During the South African war Dr. Ramsbottom was appointed chief medical officer to the Free State Forces, and in 1907 accepted the Treasurer's portfolio in the Cabinet of the Orange River Colony. On the formation of the Union he was appointed First Administrator of the Orange Free State, a post which he held till 1915, when he returned to private practice at Heilbron. For a time he presided over the South African Medical Association.

# Parliamentary Intelligence.

## HOUSE OF COMMONS.

WEDNESDAY, APRIL 13TH.

### PUBLIC HEALTH (TUBERCULOSIS) BILL.

ON the motion for the second reading of the Public Health (Tuberculosis) Bill,

Sir A. MOND (Minister of Health) explained that the measure was introduced to provide for commitments resulting from the passing of the National Health Insurance Act, 1920. The effect of the Bill was to take away from the Insurance Committees the responsibility of providing institutional treatment for tuberculosis in the case of insured persons as from April 30th, 1921, the date when the sanatorium benefit ceased. The Bill was therefore extremely urgent if the machinery by which people had enjoyed sanatorium benefit was not to come to a standstill. It was provided by the Bill that the county and county borough councils should take on the work of dealing with tuberculous persons both insured and non-insured. Of the 145 county and county borough councils in England and Wales, 124 had already made such arrangements, and the Bill imposed no fresh obligations on those councils. Of the remaining 21 councils, all but one had made some provision for the treatment of tuberculosis, but in two or three cases the provision only extended to dispensaries, and in others the arrangements of the councils for treatment in sanatoriums or hospitals did not make full provision for insured persons. The great bulk of the county and county borough councils had agreed with the Ministry of Health to make full arrangements, and so far as they were concerned the Bill was really an agreed Bill. He understood that the councils that had not yet fallen into line were practically ready to do so if they understood that the obligations were statutory ones; but in the event of any local authorities failing to carry out their duties under the Bill, power was given to the Minister to make the necessary arrangements and charge the authority with the cost. He wished to make it clear that he had no objection if it was thought desirable to insert an amendment in Committee making it quite certain that the arrangement that had been made by the Welsh National Memorial Association with the various county councils and local authorities in Wales would be safeguarded.

Mr. ORMSBY-GORE welcomed the Bill, which, although it was not much more than a skeleton, proceeded in his view on the right lines. Everything in a matter of this kind depended on the whole-hearted coöperation of the local authorities, without which all efforts to improve public health in this country were doomed to failure. The campaign against tuberculosis required strategy as well as tactics, and a complete strategetic policy was the most urgent necessity at the present moment. One of the lacunæ was this: tuberculosis was notifiable since 1912, but it was notifiable to the district medical officer, who passed on his information confidentially to the county medical officer. This seemed to be a mistake, and if they were going to follow through the life-history and the treatment of the disease they must get over that administrative difficulty. After-care needed far more attention than it received at present. Also they had to consider the children, the food, and general hygienic conditions of the country.

Mr. R. RICHARDSON welcomed the Bill on behalf of the Labour Party, but considered that matters should not be left so much to the local authorities in what was a national question, to be dealt with at the expense of the State. He recognised the difficulty of diagnosing the disease in its early stages, but he hoped the medical profession would make such an advance that that difficulty would be overcome. The greatest omission in the Bill was the question of after-treatment. Provision should be made for adequate nursing, pure food, pure milk, and everything that was necessary for the care of patients. It ought to be an instruction to every local authority that it should have an after-care committee. Every local authority ought to provide an open-air school for children suffering from the disease.

DR. NATHAN RAW pointed out the loss to the country in man power and money from a preventable disease. If, he said, Clause 3 were made mandatory rather than permissive in respect to the coöption of members of Insurance Committees, they would get the benefit of the services of those who were specially trained. A well-equipped sanatorium was the best method of treating the great mass of the people, but unless all the expense and trouble were to be wasted, local authorities should have the power to appoint an after-care committee, which should be a statutory one, to look after the patient and see that he was enabled to carry on in some degree the treatment he had received in the sanatorium. Something must be done to enable the worker who had been crippled with tuberculosis to earn a living, and the isolation of advanced cases must be seriously taken in hand.

*A National Disease: Systematic Organisation Required.*

Captain ELLIOT said that in Scotland tuberculosis was killing about 800 people a week. It was estimated that in the United States of America in the year 1903 tuberculosis cost the country £66,000,000. That was only the direct cost; as to the indirect cost, it was utterly impossible to get any sort of estimate. They were all agreed that the disease was one which they must treat; it was a national disease and ought to be treated by some systematic scheme of organisation. The principle of dividing the country into areas and making one authority in each area responsible for dealing with the disease had proved effective in dealing with other forms of disease, and they had every reason to hope that it would be equally effective in dealing with tuberculosis. They had the consolation of knowing that the work so far carried out had been effective. The number of deaths in 1914 was 50,000. In 1915 housing conditions were not noticeably worse, food was better, and employment was good, while prices had not reached the terrifically high point to which they soared later. But the deaths in that year increased by 4000. In 1916 they remained at the same total of 54,000; in 1917 they reached 55,000, and in 1918, the influenza year, they went up to 58,000. In 1919 they fell to 46,000, and in 1920 there was a further fall to 42,000. A certain amount of that decrease was undoubtedly due to the remedial measures introduced by the then Minister of Health, but a large amount of it was due to good trade in the country, and he was sure that every medical man would join with him in warning the House against the almost inevitable disturbance in our vital statistics which the present industrial crises would bring in their path. Housing was not noticeably better in 1920 than in 1918. Our vital statistics were very much better than those of any other country in Europe just now, and better almost than those of any other country in the world. He had been able to get some figures for other countries. In 1919 our death-rate was 125·8, and in 1920 it was 112·8. In Prague, where the conditions were fairly comparable with those in this country, the death-rate was 386, as compared with our 112·8. In Warsaw it was 591; in Vienna, 490; and in Cracow, 616. These were the figures for the disturbed areas to bring home what we might fear if similar disturbed conditions began to prevail in this country. A very terrible state of things might easily arise, for we had no special immunity against disease in this country. He thought the scheme of the Ministry of Health was the best way of dealing with this matter. They had got child mortality down from 110 to 80 to-day. It was said that was simply to do with the care of mothers and had nothing to do with clinics. He had discussed the matter with a medical officer of health for a borough not far from London, where the death-rate of children attending the clinic was 40, whereas the death-rate of children not attending the clinic was 77. This showed, at any rate, that the careful mother found the clinic an advantage, and the same general principles applied to tuberculosis would be of the greatest benefit in bringing down the death-rate from that disease. We had a splendid chance just now. Influenza had swept out a large number of people who would probably have become acute cases of tuberculosis. We had now a much better chance than we had ever had before of reducing the disease to practically negligible proportions in this country. Sailors, of all people, were most liable to phthisis owing to the small amount of air space they had in ships—about 45 feet, as compared with about 400 cubic feet for the tramp in the common lodging-house—and this would have to be treated as an international problem. With regard to the general treatment of after-care, the experience of the Ministry of Labour would be of the utmost value to them in the long run. They needed a sort of disabled man's roll, some sort of national scheme for a certain proportion of places in industries being reserved for the casualties of industry. He invited the coöperation of the Labour Party in some scheme of that sort. He also begged them not to adopt, as they had sometimes done in the past, a standoffish attitude towards the voluntary dispensary system, and particularly in London. He suggested that there should be some sort of clearing-house system before men were definitely marked off for sanatorium treatment. Full advantage of modern methods of diagnosis should be taken. The clearing-house system would enable the whole medical science to be concentrated on a particular case, and then it could be determined definitely, after some residence in hospital—perhaps three or six weeks—whether a person needed to start the treatment. It seemed incredible that the Royal Hospital for Diseases of the Chest, with 100 years of history behind it, was at this moment in danger of being pulled down, and had come to an arrangement by which

an equal number of beds would be erected in conjunction with a large general voluntary hospital. He would ask the London members if it was not possible for them to enter into some arrangement by which the organisation of this hospital could not be made available for clearing-house work under the new London County Council schemes which would be necessary, or which they had already set up with the approval of the Ministry of Health. The great Sanitary Acts of this country had brought down the death-rate to 15·5, far below the death-rate of other countries. Work done on the fabric of the State, the people, was work done on the foundation-stone of the building of Empire, and was in the long run far more important to the Empire than any amount of flags which might be hoisted, although they might appear a great deal more imposing at the time.

Major MOLSON thought the importance of this Bill far outweighed any question of economy at the present time, but he would not like the enthusiasts to persuade them to go in for too great expense and then arouse opposition. As a medical man he wished to say that early treatment of tuberculosis was essentially the important thing. Plenty of accommodation was important, but there was no need for very elaborate buildings, where only a few patients could be taken in and where there would be a long waiting list. The medical profession felt rather bitter that the pledges given when the National Insurance Act was passed had not been fulfilled. He urged the Minister not to bring in many conditions or regulations, but to work with the local authorities and to get their free-hearted and hearty cooperation.

Mr. JOHNSTONE, speaking as a member of the local authority which had been treating tuberculosis, agreed with the general approval that had been given to the Bill, but regretted that it had been considered necessary to remove the sanatorium benefit from the Insurance Committees. The one hopeful feature in the treatment of tuberculosis to-day was the work colony, the pioneers of which in this country were Dr. Marcus Paterson, of the Brompton Hospital, Frimley, and Dr. Varrier-Jones, of the Papworth Tuberculosis Colony, Cambridge.

Major FARQUHARSON said, as he read the Bill, something like £400,000 would be available. Sanatorium treatment at present was nothing more or less than an experiment. Almost everything about medicine was experimental. The spending of large sums on institutional treatment was not either wise or justified by the results of the past. It was only one of the whole gamut of methods of treatment—one little stage which often came in, unfortunately, when treatment of any kind was more or less useless. One fault he had to find with institutional treatment was that it produced a certain degree of what he might call passivity on the part of the patient himself. The After-Care Association encouraged that passivity when often all that was wanted was to rouse the patient to the knowledge that he was his own keeper, that his health was in his own care, that by simple attention to hygienic rules he could not only give himself a higher, better, and stronger life, but he could cease to be a burden on his fellow men.

Mr. MYERS welcomed the Bill, but expressed regret that it made no provision for preventive operations and no adequate provision for after-care treatment. He attributed the ineffectiveness of insurance committees to the appropriation by the medical profession of 6*d*. out of the 1*s*. 3*d*. that was available for all domiciliary treatment.

Sir A. MOND, replying to the points raised in the debate, said where doctors disagreed it was difficult for laymen to be dogmatic. They had been told that sanatorium treatment was a failure and also that it was most valuable; to an unprejudiced mind both statements were true. It had not achieved everything that was expected, yet he did not think anyone would say that it had not achieved beneficent results.

The Bill was read a second time.

*Revised Scale of Fees for Admiralty Surgeons.*

Captain ELLIOT asked the Secretary to the Admiralty whether he was now able to give an answer as to the revised scale of fees for Admiralty surgeons.—Mr. AMERY replied: The revised scales of fees have now been promulgated in a Fleet Order, with the exception of those for medical examinations, which are still under discussion. I am sending the honourable and gallant Member a copy of the Order in question.

*Hong-Kong Naval Hospital.*

Commander BELLAIRS asked the Secretary to the Admiralty what was the maximum number of patients that could be accommodated at the Hong-Kong Royal Naval Hospital; what were the maximum and minimum numbers accommodated in 1920; and how many convalescents were sent from there to the Yokohama Royal Naval Hospital in 1920.—Mr. AMERY replied: The maximum number of patients that can be accommodated in the Royal Naval Hospital, Hong-Kong, is 134. The maximum and minimum numbers accommodated in 1920 were 99 and 52 respectively. Eleven convalescents were sent from Hong-Kong Naval Hospital to Yokohama Naval Hospital in 1920. The latter was not reopened until June 16th, 1920, which is after the usual time of year for transferring convalescents thither from Hong-Kong.

*Encephalitis Lethargica.*

Mr. GILBERT asked the Minister of Health the number of cases of this disease which had been reported to his department in this country during the past 12 months; how many cases had proved fatal; and would he state what special steps his department had taken to deal with this epidemic.—Sir A. MOND replied: 1572 cases of encephalitis lethargica, to which disease my honourable friend no doubt refers, have been reported in England and Wales between April 1st, 1920, and March 31st, 1921. The deaths from this disease during the same period, so far as is known, at present, amount to 495. The disease was made compulsorily notifiable on Jan. 1st, 1919, and since then special reports have been received from medical officers of health in practically all the cases which have been notified, while special inquiries have been made and advice has been given by medical officers of the Ministry in suitable cases. Simultaneously the pathology of the disease is being studied in association with the Medical Research Council.—Mr. SEXTON: May I ask if the Minister of Health's department is itself quite free from this disease? (Laughter.)

*Islington Medical Officer's Superannuation.*

Lieutenant-Colonel FREMANTLE asked the Minister of Health if he was aware that the Islington Borough Council proposed to superannuate their medical officer of health after 39 years' efficient and energetic service (10 years under the Corporation of Sunderland and 29 years at Islington) at a rate which was not fixed on any definite scale, and was far below that usually granted to executive officers; and seeing that the Superannuation (Metropolis) Act, 1866, provided for the payment of superannuation at the rate of one-sixtieth of salary for every year of service, that the Act is intended to apply without discrimination between the employees of local authorities, that the Islington Borough Council have adopted this Act in superannuating their roadmen, scavengers, and other labourers, and that the medical officer of health has requested the protection of the Minister of Health against the non-application of the scale in his case, would he say what steps he proposed to take in the matter.—Sir A. MOND replied: I am making inquires as to this case, and will inform my honourable and gallant friend of the result.

*Dental Legislation.*

Mr. RAFFAN asked the Minister of Health whether it was still the intention of the Government to introduce a measure, during the present session of Parliament, for the purpose of carrying out the recommendations of the departmental committee on the Dentists Act, 1878.—Sir A. MOND replied: I am afraid that owing to the congestion of the Government legislative programme, legislation on this subject will not be practicable during the present session.—Mr. RAFFAN: Is my right honourable friend aware that his predecessor promised that legislation should be introduced if there was any general agreement on the subject; and if we are able to assure the right honourable gentleman that there is a general agreement and that little time will be occupied, will he reconsider the matter?—Sir A. MOND: I had no intention to introduce a Bill this session, and of course the programme of legislation is very much upset already, and I am also informed that there is very little chance of there being any agreement. Of course I shall be glad to look into the matter again, but I do not know how any Member or group of Members can assure me that there is going to be agreement, and I am sure the House does not want an autumn session.—Mr. RAFFAN: Will the right honourable gentleman be prepared to receive representations on the matter from Members of Parliament?—Sir A. MOND: I shall be very pleased.

THURSDAY, APRIL 14TH.

*Public Health (Tuberculosis) Expenses.*

The House went into Committee of Supply on the money resolution of the Public Health (Tuberculosis) Bill, Sir E. CORNWALL in the chair.—The resolution was agreed to.

*Ministry of Health Draft Order.*

On the motion "That the Ministry of Health (Factories and Workshops, Transfer of Powers) Draft Order, presented the 28th February, 1921, be approved," Lieutenant-Colonel FREMANTLE said the Draft Order went to the root of the formation of the Ministry of Health. The formation of that Ministry was heralded with great words as regarded the prospects of the custody of the health of the nation, and to it were referred certain powers, while certain other powers were reserved that might be added afterwards. Thirdly, there was a general power of taking over other powers that might conduce to the national health. It was a very serious and sound

criticism of the Ministry of Health in its original constitution and conception that the whole question of health in the factories, as administered by the Home Office, should have been excluded from the functions of the Ministry. However, they had some very small contribution in the right direction in this Order, which transferred to the Ministry of Health certain powers and duties of certain sections of the Factories and Workshops Act, 1901—namely, Section 61 (Employment of Women After Childbirth), Sections 97 to 100 (Provisions Relating to Bakehouses), Section 109 (Making of Wearing Apparel where there is Scarlet Fever or Small-pox), and Section 110 (Prohibition of Home Work where there is Infectious Disease). He hoped this might be the prelude to the natural transference to the Ministry of Health of the whole general conception and survey of health matters in factories and workshops.—The motion was agreed to.

*Public Health Officers (No. 2) Bill.*

This Bill was read a second time.

*Medical Equipment of the Auxiliary Division.*

Lieutenant-Colonel WALTER GUINNESS asked the Chief Secretary to the Lord Lieutenant of Ireland if he could say whether the Auxiliary Division had the same quota of the Royal Army Medical Service attached to them as would be provided in the case of a corresponding number of troops employed in active military operations; and whether they had special ambulance cars allotted to them for the conveyance of wounded men.—Mr. HENRY (Attorney General for Ireland) replied: The Auxiliary Division is not provided with its own special medical transports. Ambulances and other necessaries of medical equipment are borrowed from the regular forces as and when required, and this arrangement has been found to answer satisfactorily.—Lieutenant-Colonel GUINNESS: Has the attention of the right honourable gentleman been drawn to the terrible sufferings of many of the auxiliaries who have been wounded in the Longford Camp; will he make further inquiries and consult the Director of the Royal Army Medical Service in Ireland as to what steps have been taken to prevent a recurrence of these terrible occurrences to men suffering from grievous wounds who have been left lying in the open without proper attention?—Mr. HENRY: I will certainly bring this matter to the attention of the authorities.—Earl WINTERTON: In the case of the Longford Camp, there is a gross scandal in connexion with the wounded servants of the Crown who have been left lying about for 24 hours open to being mutilated by Sinn Feiners because no proper provision was made for them and because it was not the duty of the Army authorities to convey them to the hospital.—Mr. HENRY: The matter is receiving the attention of the authorities.

*Medical Benefit Statistics.*

Sir CROYDON MARKS asked the Minister of Health the total number of persons receiving medical benefit; the amount paid to them the first week in March, 1921, and the corresponding week in 1920; and the total number of persons in sanatoriums or institutions for the treatment of tuberculosis for the first week in March, 1921, and the corresponding week in 1920.—Sir A. MOND replied: The number of persons in England and Wales entitled to medical benefit is approximately 12,750,000. I regret that no figures are available of the number of insured persons actually receiving (*a*) medical treatment, and (*b*) cash benefits in particular weeks. The total number of insured persons in England and Wales who were receiving treatment for tuberculosis in sanatoriums or other institutions was 8922 on March 1st, 1921, and 8754 on March 1st, 1920. The actual number of non-insured persons receiving such treatment on those dates is not available, but the total number of beds available for non-insured and insured persons in approved institutions for the treatment of tuberculosis was 17,894 on March 1st, 1921, and 16,432 on March 1st, 1920.

*Pay of the R.A.M.C. Officers in India.*

Lieutenant-Colonel WALTER GUINNESS asked the Secretary for India whether the increases of pay of certain specified services serving in India promised in Indian Army Order No. 868, of October, 1919, and sanctioned to date from July 1st, 1919, had in the case of the Royal Army Medical Corps, taken effect only from Jan. 1st, 1920, instead of from the earlier date as in the case of all other corps; and what was the reason for this distinction between officers who were serving under identical conditions.—Mr. MONTAGU replied: The pay of Royal Army Medical Corps officers in India was increased in March, 1920, with effect from July 1st, 1919. Consequent upon an increase of pay granted to Indian Medical Service officers, with effect from Jan. 1st, 1920, a further increase has recently been granted to Royal Army Medical Corps officers, with effect from the same date.

MONDAY, APRIL 18TH.

*Summer Time and Children's Health.*

Mr. ROBERT YOUNG asked the President of the Board of Education whether any consideration had been given to the effect on the health of young children as the result of the operation of the Daylight Saving Act; whether the earlier hours of attendance at school and the consequently prolonged day reducing their hours of sleep had had any injurious effect; and, if so, what steps he proposed to take in the matter.—Mr. FISHER replied: I cannot add anything to the summary contained in Paragraphs 32 to 36 of the Report of the Summer Time Committee, 1917 [Cd. 8487]. I will, however, ask the local education authorities to make arrangements for observing the effect of the Summer Time Act on the health of the school children in their areas this year. But, as the honourable Member is aware, the matter is primarily one of parental supervision.

# Medical News.

UNIVERSITY OF CAMBRIDGE.—**Professor Frederick** Gowland Hopkins, F.R.S., Fellow and Prelector in Biochemistry at Trinity College, has been elected to the newly established Sir William Dunn Professorship of Biochemistry.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—The Quarterly Council was held on April 14th, with Sir Anthony Bowlby in the chair.—The President opened the envelope bearing the winning motto of the dissertation adjudged by the Jacksonian Prize Committee, and announced the winner of the prize to be Mr. Harold Burrows, F.R.C.S., of Southsea.—It was resolved that the subject for the prize for the year 1921 should be "The Effects Produced by Radium upon Living Tissues, with Special Relation to its Use in the Treatment of Malignant Disease."—A report was read from the Walker Prize Committee, dated Feb. 28th, 1921, and in pursuance of this report it was resolved that the Walker Prize for the period 1916-1920 be not awarded.—A report was read from the John Tomes Prize Committee, dated March 9th, 1921, and in pursuance of the recommendation contained in the report it was resolved that the prize for 1918-1920 be awarded to Dr. James Sim Wallace, L.D.S.—The President opened the envelope containing the motto of the essay adjudged by the Cartwright Prize Committee to be the winning essay, and announced that the winner of the medal and honorarium of £85 was Mr. W. Kelsey Fry, M.R.C.S., L.D.S.—It was resolved that the subject for the Cartwright Prize for 1921-1925 should be "Variations in the Form of the Jaws, with Special Reference to their Ætiology and their Relation to the Occlusion of the Dental Arches."—A report, dated April 7th, was read from the Examiners in Anatomy under the Conjoint Board regarding the Begley studentship, and it was resolved that in pursuance of this report Mr. Kenneth Owen Parsons, of Guy's Hospital, be appointed Begley student for the ensuing three years.—The Council, under Section 5 of the Charter of the 15th Victoria, balloted for the election to the Fellowship of the following Members of 20 years' standing: Professor Charles Scott Sherrington, P.R.S., and Sir S. Squire Sprigge.—The Council elected Mr. Raymond Johnson as the Representative of the College on the Senate of the University of London for the period from May 10th next to the second Tuesday in May, 1925, in the vacancy by the retirement of Sir Charters J. Symonds.—The secretary reported that at the last four Final Examinations for the Fellowship 245 candidates were admitted under the ordinary conditions, and that of these 156, or 64·2 per cent., failed, and that under the special war conditions 104 candidates were admitted, of whom 71, or 68 per cent., failed.—The President reported that he, Mr. H. J. Waring, Mr. R. Johnson, and Sir Cuthbert Wallace attended before the Voluntary Hospital Committee at the offices of the Ministry of Health on March 16th last and gave evidence on behalf of the College in support of the retention of the voluntary system as of great importance in the interests of the sick and of medical education.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH, ROYAL COLLEGE OF SURGEONS OF EDINBURGH, AND ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.—The following candidates have passed the Triple Qualification Examination:—

THIRD EXAMINATION.

Robert W. P. Hall, James S. Allan, James A. McE. S. Evers, James M. McLintock, Henry G. F. Cubitt, Ernest Levine, Patel S. H. Masters, Alexander W. Buchan, and John M. Cockburn.

*Pathology.*—Helen J. Hamilton, John J. Mann, James M. Orombie and George A. P. McConey.

*Materia Medica.*—George F. Maher, Andrew A. Dewar, Percy A. M. Jayewardene, Bruce F. Home, Annie F. Perry, and Robert P. Anderson.

FINAL EXAMINATION.

Helen Worthington, Daniel R. Cilliers, Norman M. D. Fox, Don James H. Ferdinando, John Murray, Ardishir Jahangirji Vakil, Arnold A. Hamilton, Alan B. Taylor, Reginald E. Hopton, James I. Coventry, Ronald G. Clouston, Peter F. Fairley, Samuel Denis de Vos, Bakhtawar Singh Jain, Francis Xavier H. Hayes, John J. L. McDonald, Frederic L. A. Gace, Gilbert H. Thomas, and Krishna Abaji Deodhar.

*Medicine.*—Abdus Shakur, James L. Lloyd-Jones, Vincent H. L. Anthonisz, William B. Stott, William Campbell, Ram Nath Nanda, and Aflatum Yacub Khan.

*Surgery.*—James S. A. Rogers, Otho P. Fox, William B. Stott, and Ram Nath Nanda.

*Midwifery.*—Abdus Shakur, James L. Lloyd-Jones, John R. Williams, Otho P. Fox, James Pedris, Elliot P. Dewar, and Aflatum Yacub Khan.

*Medical Jurisprudence.*—Enid A. Williams, Thomas T. Hoskins, George H. Dobbin, Mohamed Shafie Hassen, Philip G. Bainbridge, Duncan R. Nicol, James L. Lloyd-Jones, and Rachel Caplan.

LONDON SCHOOL OF TROPICAL MEDICINE.—Sir Leonard Rogers, C.I.E., F.R.S., has been appointed extra physician for clinical research, a position which has been specially created for him; he will lecture upon subjects, such as leprosy, to which he has paid special attention.—Lieutenant-Colonel W. W. Clemesha, C.I.E. (I.M.S. retired), has been appointed lecturer on hygiene in the tropics in succession to Professor W. J. Simpson, who has recently retired. Colonel Clemesha is well known for his work upon the water-supplies of India. He has held the post of Sanitary Commissioner to the Government of India, and latterly acted as Director of Medical Services, East African Force. He is therefore well qualified to speak authoritatively upon the most recent developments of sanitary science in the tropics.

The following candidates passed the examination held at the termination of the sixty-fifth session (January–April, 1921):—

*C. T. Maitland (Duncan medal), *H. E. S. Richards, *A. Crawford, *Miss M. M. Ross, *R. G. Simpson, *J. O. Beven, *W. M. Howells, J. M. Wallace, J. Segal, O. M. Banhawy, D. N. Gore, P. Parthasarathy, M. Morrison, L. M. Sen, B. K. Ray, J. C. Rowan, H. Smith, Miss A. Shaw, D. S. Scott, R. A. W. Procter, Miss A. M. Mackay, J. C. Coetzee, K. A. Gandhi, C. L. Sahni, N. S. Kotwall, F. X. Costello, K. C. Cheng, S. Miller, P. N. Button, Miss M. Jervis, A. R. McLean, Miss L. J. Murphy, A. R. Jennings, and Miss M. J. Ahern.

* With distinction.

ROYAL MEDICAL BENEVOLENT FUND.—The annual meeting was held at 11, Chandos-street, London, W., on April 5th, with Sir Thomas Barlow, the President, in the chair. The annual report was received and adopted. It was stated that the average amount of the grants at present distributed is quite inadequate and should be considerably increased. All friends of the Fund were urged to make the wants of the Funds more widely known to their medical brethren, and to obtain new subscribers. The total amount received in donations and subscriptions was £3395 4*s.* 7*d.*, compared with £2865 3*s.* 10*d.* in the preceding year, an increase of £530 0*s.* 9*d.* The total distributed in grants during the year, including Christmas gifts made to the more urgent cases, was £2836 13*s.* 1*d.*, of which £246 9*s.* was provided from the Dinner Fund account. In the annuity department the amount this year available was £4021 1*s.* 10*d.* against £3897 9*s.* 5*d.* the previous year, an increase of £123 12*s.* 5*d.* The annuitants, who must be over 60 years of age, amount in number to 178, and in December last it was agreed to increase the amount of 38 of the pensions from £20 to £26. Grants to the amount of £5926 17*s.* 6*d.* have been made in connexion with the War Emergency Fund, and invaluable assistance has been rendered to a large number of medical men who had held commissions and found themselves on their return to practice unable to carry on without such help. The committee have already agreed to bear the cost of the education of 25 boys and girls at public schools, and they would welcome applications for such purpose on behalf of any who are eligible for help from the Fund. At present three boys are being educated at Epsom College, and the names of three more have already been entered, while the fees of 19 other children are being paid at various schools. The total amount received for the Fund amounts to £34,818 and the amount expended to £18,920. The following officers were re-elected for the ensuing year: Sir Thomas Barlow, President; Sir Charters Symonds, treasurer; and Dr. Newton Pitt, hon. secretary.

At the meeting of the committee held on April 12th 29 cases were considered, and £397 voted to 26 applicants. The following is a summary of some of the cases relieved:—

Widow, aged 67, of M.D. Dub. who practised in London and died in 1918. Applicant was left entirely without means. She has five grown-up children, but none of them are able to help her. Since the death of her husband she has paid rent, 15*s.* per week, by selling her furniture. Two sisters, now dead, used to clothe and help to support her. Voted £12 in 12 instalments.—Widow, aged 87, of L.F.P.S. Glasg. who practised in Holloway, and died in February, 1921. Applicant's husband was granted £30 in six instalments from the Fund. Applicant is now left with only the Old Age Pension, and her rent is 7*s.* per week. Voted £25 in 12 instalments.—Widow, aged 61, of M.R.C.S. Eng. who practised in Manchester, and died in 1915. Applicant asks help from the Fund owing to the recent loss of her eldest daughter through consumption, who was her chief support. Her only income is derived from letting rooms. Son only receives 9*s.* per week as an engineer's apprentice and has still another 18 months to serve. The second daughter is not working at the present time. Voted £10.—Daughter, aged 47, of M.R.C.S. Eng. who practised at Woodford and died in 1913. Applicant and sister live together; both of them are delicate and unable to work. The mother, aged 80, was an annuitant of the Fund. Since the father's death friends have collected sums of money to keep mother and sisters. This case was strongly recommended. Voted £10 in two instalments.—Daughter, aged 54, of M.R.C.S. Eng. who practised at Redcar and died in 1873. Applicant is a trained nurse, but owing to ill-health and an operation in November last is now incapacitated. She is now dependent upon her sister, who has to earn her living as a dressmaker. Applicant is entirely without means. Voted £18 in two instalments.—M.R.C.S. Eng., aged 54, single, who practised in Liverpool and West Africa. His health was entirely undermined through living abroad, and he is quite unable to follow his profession. A brother-in-law allows him £24 per annum, and he earns about 12*s.* per week as a temporary postman. Applicant pays a portion of the rent, which is £7 16*s.* Relieved eight times, £70. Last time £10 in March, 1920. Voted £10 in two instalments.—Daughter, aged 59, of M.R.C.S. Eng. who practised at Newport (Mon.) and died in 1892. Applicant worked for 19 years as a church worker in Wales, but owing to partial blindness and internal trouble has had to give it up. The Royal United Kingdom Beneficent Association allows her £25 per annum. She also receives a little help from the Guild and a grant from the Fund for the last ten years. Relieved ten times, £135; last time £18 in April, 1920. Voted £18 in 12 instalments.

Subscriptions may be sent to the honorary treasurer, Sir Charters J. Symonds, K.B.E., at 11, Chandos-street, Cavendish-square, London, W. 1.

DONATIONS AND BEQUESTS.—By will the late Miss Mary Wainwright, of Croxteth-road, Liverpool, bequeathed £1200 to the Northern Hospital, Liverpool, in memory of her father, one of the founders.

THE annual dinner of the Indian Medical Service will be held at the Trocadero on Wednesday, June 15th, Major-General Sir R. Havelock Charles, G.C.V.O., in the chair. Tickets and all particulars may be obtained from the joint hon. secretary, Colonel J. J. Pratt, I.M.S. (ret.), 63, Addison-road, Kensington, W. 14.

CHADWICK PUBLIC LECTURES.—Three lectures on Fevers in England: their Prevention and Control, with Special Reference to the Effects of Public Health Acts (1848–1918), will be given by Dr. William Hunter in the lecture-room of the Medical Society of London, 11, Chandos-street, on Thursdays, May 5th, 12th, and 19th, at 5.15 P.M. Admission is free.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL.—At the opening of the summer session of the Central London Throat and Ear Hospital, Gray's Inn-road, on Wednesday, May 4th, at 4 P.M., Mr. Arthur Cheatle will give a lantern demonstration on "The Cellular Development in the Temporal Bone."

TUBERCULOSIS SOCIETY OF GREAT BRITAIN AND IRELAND.—A clinical meeting of the society will be held at the Margaret-street Hospital, Margaret-street, Oxford-street, London, on Monday, April 25th, at 7.15 P.M. Cases will be shown by Dr. L. S. T. Burrell and Mr. P. Franklin, and Mr. Franklin will read a paper on Tuberculous Laryngitis, with demonstration of cases.

FEDERATION OF MEDICAL AND ALLIED SOCIETIES.—The Medical Council of this Federation at their next meeting propose to consider again pressing for a public inquiry into the conditions under which medical benefit is provided for insured persons. They will do this with special regard to supplementing the resources of the panel practitioner by providing hospital and laboratory facilities that would enable him to give efficient treatment.

HERITAGE CRAFT SCHOOLS, CHAILEY.—A festival dinner in support of these schools was held at the Savoy Hotel on April 13th, Dame Margaret Lloyd George presiding. The medical guests included Sir Robert Jones, Mr. E. Hurry Fenwick, Dr. S. Russell Wells, Sir D'Arcy Power, Dr. Graham Little, Dr. C. W. Kimmins, and Dr. William Brown. It was stated that most of the children in the schools were suffering from surgical tuberculosis. Sir Jesse and Lady Boot had presented an operating theatre, now under construction, and further arrangements for surgical and operative work were still needed. Contributions should be sent to Miss A. C. Rennie, hon. treasurer; further information can be obtained from the founder and hon. secretary, Mrs. C. W. Kimmins, the Heritage Craft Schools, Chailey, Sussex.

NEW COMMISSIONER OF PRISONS.—Dr. Sidney Reginald Dyer, Medical Inspector of Prisons, Home Office, has been appointed Commissioner of Prisons (England and Wales). Dr. Dyer was formerly medical officer of H.M. Prisons, Stafford, Wandsworth, and Brixton, and was called to the Bar at the Middle Temple in 1896.

LITERARY INTELLIGENCE.—Nippon-no-Ikai-Sha, publishers, of Tokyo, announce the appearance this month of a new medical monthly in English, entitled the *Nippon-no-Ikai*, or the *Japan Medical World*. It will contain original articles, notes on current Japanese medical literature, archives of medical societies, and medical news. The annual subscription is $6.00; single copies, $0.50, post free. Dr. S. Tsuchiya will direct the publication.

**ON the resignation of Dr. Edward Walford from** the appointments of medical officer of health for the city and port of Cardiff and school medical officer, he has been granted a pension or retiring allowance of £500 per annum under the superannuation clauses of the Cardiff Corporation Act, 1920. Dr. Walford had held these posts since January, 1888, his predecessor, Dr. H. J. Paine, having held office from 1847 until 1888. Thus Cardiff has had but two medical officers of health for the city in three-quarters of a century.

# Appointments.

***Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.***

ALLAN, J., M.D., B.Ch. Edin., D.P.H., has been appointed Oculist to the Royal West of England Institution for the Deaf and Dumb.

PUNCH, A. L., M.B. Lond., M.R.C.P., Physician (in charge of out-patients), Great Northern Central Hospital, Holloway.

RICHARDSON, S. R., M.D. Dub., Assistant Medical Officer of Health for Ealing.

RUTHERFORD, MARGARET E., Assistant Medical Officer of Health to the Southend Corporation.

WALSHE, F. M. R., M.D. Lond., F.R.C.P. Lond., Assistant Physician to Out-patients to the National Hospital for the Paralysed and Epileptic, Queen-square, W.C.

WATT, J., L.R.C.P. & S. Edin. L.F.P.S. Glasg., Certifying Surgeon under the Factory and Workshop Acts for Portree.

# Vacancies.

***For further information refer to the advertisement columns.***

*Aberdeen Dispensary and Vaccine Institution.*—Hon. M.O.

*Bethlem.*—Two Res. H.P.'s. £25 per quarter.

*Birmingham General Hospital.*—Three H.S.'s. £100. Also H.S. to Special Departments. £125.

*Bootle Borough Hospital.*—Third H.S. £120.

*Bramshott, Hants, King George's Sanatorium for Sailors.*—Med. Supt. £600.

*Bridgwater Hospital.*—H.S. £165.

*Brighton, Royal Sussex County Hospital.*—H.P. £160.

*Buxton, Derbyshire, Devonshire Hospital.*—H.P. £250.

*Cambridge, Addenbrooke's Hospital.*—H.S. £130.

*Canning Town Women's Settlement Hospital, Balaam-street, Plaistow, E.*—Female Hon. Asst. P. and Hon. Asst. S.

*Charing Cross Hospital, Agar-street, W.C.*—P. in Charge Department of Radiology and Electro-therapeutics.

*Chester Royal Infirmary.*—Hon. S. Hon. Asst. P. Also Asst. H.S. £175.

*Colchester, Essex County Hospital.*—H.S. £200.

*Essex County Council.*—Asst. County M.O. £600.

*Evelina Hospital for Children, Southwark, S.E.*—Hon. Dent. S. Also H.P. and H.S. £160.

*Falkirk and District Infirmary.*—Res. M.O. £200.

*Gloucester County Asylum.*—Locum Tenens, 7 gs. weekly.

*Holloway Sanatorium, Virginia Water, Surrey.*—Jun. Asst. M.O. £400.

*Hong-Kong, Port Health Officer.*—Sec. Health O. £600.

*Hospital for Sick Children, Great Ormond-street, W.C.*—H.S.'s. £50.

*Hove, Carr-Burton Memorial Hospital, Sackville-road.*—Res. M.O. £250.

*Huddersfield Royal Infirmary.*—Two Jun. H.S.'s. £200.

*Isle of Wight County Hospital, Ryde.*—Hon. Path.

*Johannesburg, University College.*—Sen. Lecturer in Physiology. £516.

*Kent Education Committee.*—Female Sch. Med. Inspector. £600.

*Liverpool Maternity Hospital and Ladies Charity.*—Two Hon. Asst. S.'s.

*London Temperance Hospital, Hampstead-road, N.W.*—Hon. Asst. P.

*Manchester County Asylum, Prestwich.*—Asst. M.O. £572 18s.

*Manchester, Crossley Sanatorium, Delamere Forest, Cheshire.*—Asst. M.O. £350.

*Manchester, Withington Institution and Hospital, Nell-lane, West Didsbury.*—Asst. M.O. £350.

*Metropolitan Hospital, Kingsland-road, E.*—Cas. O. and Res. Anæsth. £120

*Middlesbrough, North Riding Infirmary.*—Jun. H.S. and Sen. H.S. £150 and £200 respectively.

*Miller General Hospital for South-East London, Greenwich-road, S.E.*—M.O. for X Ray Dept. £75. Res. Cas. O. and H.P. £150.

*National Hospital for the Paralysed and Epileptic, Queen-square, W.C.*—M.O. in charge of Electro-Therapeutic Dept. £100.

*Newark Hospital and Dispensary.*—Res. H.S.

*Newport, Mon., Royal Gwent Hospital.*—H.S. £200.

*Oldham Royal Infirmary.*—Three H.S.'s. £250 and £200 respectively.

*Oxford City.*—Asst. M.O.H. and Sch. M.O. £500.

*Oxford, Warneford Hospital for Mental Diseases.*—Asst. M.O. £375.

*Preston and County of Lancaster Royal Infirmary.*—H.S. £180.

*Preston, Lancs, County Asylum, Whittingham.*—Asst. M.O. £572 18s.

*Prison Medical Service.*—M.O.'s. £300.

*Queen Mary's Hospital for the East End, Stratford, E.*—H.P. and H.S.

*Queen's Hospital for Children, Hackney-road, Bethnal Green, E.*—Two Cas. H.S.'s. £100. Also Asst. P.

*Rhondda Urban District Council.*—Asst. M.O.H. and School M.O. £600.

*Rotherham Hospital.*—Sen. H.S. £250. Also Jun. H.S. £150.

*Royal Ear Hospital.*—Anæsth. and H.S.

*Royal Eye Hospital, St. George's Circus, S.E.*—Jun. H.S. £70.

*St. Helens Borough.*—M.O.H. £900.

*Salford Royal Hospital.*—H.S.'s £150. Cas. H.S. £150.

*Sheffield, Jessop Hospital for Women.*—Registrar. £250.

*Sheffield Royal Infirmary.*—H.S.'s, H.P.'s, Aural H.S., Asst. M.O. and Asst. Cas. O. £150 each.

*Shoreditch Hospital, 204, Hoxton-street.*—Third Res. Asst. M.O. £325.

*South London Hospital for Women, South Side, Clapham Common, S.W.*—Female Asst. S. Also Clin. Assts.

*Staffordshire General Infirmary, Stafford.*—H.P. £200.

*Swansea Hospital.*—Locum H.S. £200.

*Ventnor, Isle of Wight, Royal National Hospital for Consumption.*—Asst. Res. M.O. £300.

*West Bromwich and District Hospital.*—Res. Asst. H.S. £200.

*York County Hospital.*—H.S. £200.

THE Chief Inspector of Factories, Home Office, S.W., gives notice of a vacancy for a Certifying Surgeon under the Factory and Workshop Acts at Lyneham.

# Births, Marriages, and Deaths.

## BIRTHS.

WIRGMAN.—On April 16th, at Victoria-grove, W., the wife of C. Wynn Wirgman, M.D., F.R.C.S., of a son.

## MARRIAGES.

CAIRN—SARKIES.—On the 13th April, at Paddington, Myles Denton Cairn, M.D., B.Sc. Lond., of Hove, Sussex, to Mavis, younger daughter of Mr. J. Sarkies, late I.C.S., and Mrs. Sarkies.

GRAHAM—BONNER.—On April 6th, at All Saints' Parish Church, Battersea Park, Norman Bell Graham, M.C., M.B., D.P.M., of Belfast, to Fannie Joan, third daughter of the late G. T. Bonner, Esq., and Mrs. Bonner, of Derby.

HENDERSON—ADIE.—On April 9th, at Voe, Shetland, John Robertson Henderson, C.I.E., M.B., C.M., to Eliza Beatrice, daughter of the late Mr. W. J. Adie, of Voe, and Mrs. Adie, Voe House.

## DEATHS.

BARNES.—On April 12th, at Portland-square, Carlisle, Henry Barnes, O.B.E., M.D., LL.D., aged 78 years.

BLENKARNE.—On April 10th, William L'Heureux Blenkarne, M.R.C.S., L.S.A., of Ladbroke Lodge, Windsor-road, Worthing, aged 74 years.

MEEK.—On April 17th, at Cynlas, King's-road, Colwyn Bay, William Ombler Meek, M.B., C.M. Edin., in his 78th year.

THELWALL.—On April 17th, at Presteigne, Radnorshire, Llewellyn Thelwall, L.R.C.S., L.R.C.P., aged 66 years.

WRIGHT.—On April 2nd, suddenly, Joseph Farrall Wright, M.R.C.S., L.R.C.P., of 46, Derby-street, Bolton.

***N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.***


**THE LANCET: SUBSCRIPTION RATES.**

| | | | | | |
|---|---|---|---|---|---|
| INLAND | One Year | ... | ... | ... | £2 2 0 |
| | Six Months | ... | ... | ... | 1 1 0 |
| | Three Months | ... | ... | ... | 0 10 6 |
| ABROAD | One Year | ... | ... | ... | £2 10 0 |
| | Six Months | ... | ... | ... | 1 5 0 |
| | Three Months | ... | ... | ... | 0 12 6 |

Subscriptions may commence at any time, and are payable in advance. Cheques and P.O.'s (crossed "London County Westminster and Parr's Bank, Covent Garden Branch") should be made payable to the Manager, Mr. CHARLES GOOD, THE LANCET Offices, 423, Strand, London, W.C. 2.

**ADVERTISEMENT RATES.**

Books and Publications ... ... } Four Lines and
Official and General Announcements } under... ... 6s. 0d.
Trade and Miscellaneous Advertisements ... ... ... ... }

Every additional line, 1s. 6d.

Quarter Page, £5. Half a Page, £6. Entire Page, £12.

Special Terms for Position Pages.

# Medical Diary.

## SOCIETIES.

**ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.**

**Monday, April 25th.**

SPECIAL GENERAL MEETING OF FELLOWS: at 5 P.M.

*MEETINGS OF SECTIONS.*

**Monday, April 25th.**

SECTION OF ODONTOLOGY: at 8 P.M.
*Paper:* Mr. G. G. Campion and Mr. John Millard: Some Notes on the Growth of the Face.

**Tuesday, April 26th.**

SECTION OF MEDICINE.
CLINICAL MEETING at St. Bartholomew's Hospital. Tea at 4 P.M.
*Cases:* The following will be shown by—
Dr. George Graham: Treatment of Diabetes.
Dr. A. E. Gow: Intravenous Protein Therapy.
Dr. Drysdale: Splenectomy in Acholuric Jaundice.
Dr. F. R. Fraser: Digitalis Treatment by the Rapid Method.
Other cases will be shown by Members of the Hospital Staff.

**Thursday, April 28th.**

SECTION OF UROLOGY.
At 3.30 P.M., at St. Bartholomew's Hospital:
Operations will be performed by Mr. W. Girling Ball.
At 8.30 P.M., at 1, Wimpole-street, W.:
*Paper:*
Mr. R. Thompson: The Treatment of Epispadias and of Extroversion of the Bladder, with Some Remarks relating to their Origin and Anatomy.
*Specimens* will be shown by 8.15 P.M.

ROYAL SOCIETY OF ARTS, John-street, Adelphi, W.C.
MONDAY, April 25th.—8 P.M., Cantor Lecture (III.):—Dr. S. J. Lewis: Recent Applications of the Spectroscope and the Spectrophotometer to Science and Industry.

TUBERCULOSIS SOCIETY OF GREAT BRITAIN AND IRELAND, at Margaret-street Hospital, Margaret-street, Oxford-street, W.
MONDAY, April 25th.—7.15 P.M., Clinical Meeting. Cases will be shown by Dr. L. Burrell and Mr. P. Franklin. Paper:—Mr. Franklin: Tuberculosis Laryngitis, with Demonstration of Cases.

ILLUMINATING ENGINEERING SOCIETY, at the Royal Society of Arts, John-street, Adelphi, W.C.
TUESDAY, April 26th.—8 P.M., Discussion on Ship-lighting, in Relation to Comfort, Safety, and Efficiency, to be opened by Mr. W. J. Jones.

## LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

**ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.**
Museum Demonstrations in the Theatre of the College for Advanced Students and Medical Practitioners:—
MONDAY, April 25th.—5 P.M., Prof. Shattock: Osteoma.
FRIDAY.—5 P.M., Prof. Keith: Peritoneal Adhesions and Intestinal Stasis.

**WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith, W.**
MONDAY, April 25th.—2 P.M., Dr. S. Pinchin: Medical Out-patients. Dr. Simson: Diseases of Women. Dr. Morton: X Ray Department. 2.30 P.M., Mr. Baldwin: Visit to Surgical Wards.
TUESDAY.—10 A.M., Dr. McDougal: Electrical Department. 2 P.M., Mr. Banks Davis: Diseases of the Throat, Nose, and Ear. Mr. T. Gray: Surgical Out-patients. 2.30 P.M., Mr. Addison; Visit to Surgical Wards.
WEDNESDAY.—10 A.M., Mr. MacDonald: Genito-Urinary Department. 2 P.M., Mr. D. Armour: Visit to Surgical Wards. Mr. Sinclair: Surgical Out-patients. Mr. Gibb: Eye Department.
THURSDAY.—2 P.M., Mr. Baldwin: Orthopædic Department. Mr. B. Harman: Eye Department. Mr. D. Armour: Operations. 2.30 P.M., Dr. A. Saunders: Visit to Medical Wards.
FRIDAY.—10 A.M., Mr. D. Buxton: Dental Department. 2 P.M., Dr. Burnford: Medical Out-patients. Dr. Pernet: Skin Department. 2.30 P.M., Dr. Pritchard: Visit to Surgical Wards.
SATURDAY.—10 A.M., Dr. A. Saunders: Medical Diseases of Children. 2 P.M., Dr. Owen: Medical Out-patients.
Daily:—10 A.M. Ward Visits. 2 P.M., In-patient, Out-patient Clinics and Operations.

**NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.**
Special Intensive Course.
Daily:—10.30 A.M. and 11.45 A.M., Demonstration on Clinical and Laboratory Methods. 2 P.M. and 3 P.M., Groups of Illustrative Cases. 4.30 P.M., Clinical Lectures (free to medical practitioners). Lecture I.:—Monday, April 25th, Sir William Hale-White: Pleurisy. Full Syllabus printed in Bulletin of Fellowship of Medicine.

LONDON LOCK HOSPITAL, Harrow-road, W.
Special Course of Instruction in Venereal Disease.
MONDAY, April 25th.—2.30 P.M., Mr. Thomson: Mode of Preparing Detoxicated Vaccines for the Treatment of Gonorrhœa.—5 P.M., Mr. Gibbs: Complications in the Treatment of Syphilis.
TUESDAY.—2.30 P.M., Mr. McDonagh: Symptoms and Treatment of Metallic Intoxication. 5 P.M., Mr. Juler: Syphilitic Diseases of the Fundus, Orbit, and Ocular Muscles.
WEDNESDAY.—4.30 P.M., Mr. Joly: Treatment of Chronic Gonorrhœa in the Male.
FRIDAY.—2.30 P.M., the Pathologist: Practical Demonstration of Tests Used in Syphilis. 4 P.M., Mr. Abraham: Late Sequelæ of Gonorrhœa in the Female.

**ST. JOHN'S HOSPITAL FOR DISEASES OF THE SKIN, 49, Leicester-square, W.C.**
THURSDAY, April 28th.—6 P.M., Chesterfield Lecture:—Dr. W. K. Sibley: Lupus Vulgaris and Erythematosus.

INSTITUTE OF PATHOLOGY AND RESEARCH, St. Mary's Hospital, in the Lecture-room of the Bacteriological Department.
A Course of Lectures on Pathological Research in its Relation to Medicine, open to all Members of the Profession and Students.
THURSDAY, April 28th.—4.30 P.M., Introductory Lecture:—Sir Almroth E. Wright: Acidosis and Acidæmia, with special reference to Scurvy and Shock.

ROYAL INSTITUTION OF GREAT BRITAIN, Albemarle-street, Piccadilly, W.
TUESDAY, April 26th.—3 P.M., Lecture II.:—Prof. A. Keith: Darwin's Theory of Man's Origin (in the Light of Present Day Evidence).

**MANCHESTER ROYAL INFIRMARY POST-GRADUATE CLINIC.**
TUESDAY, April 26th.—4.30 P.M., Lecture:—Mr. J. G. Clegg: Iritis and Cyclitis.

**MANCHESTER FRENCH HOSPITAL POST-GRADUATE LECTURES, 24, Acomb-street, Whitworth Park.**
Special Course of Lectures in Gynæcology.
WEDNESDAY, April 27th.—11 A.M., Demonstration Operation.
THURSDAY.—4.30 P.M., Lecture III.:—Dr. A. C. Magian: Uterine Infections.

## Communications, Letters, &c., to the Editor have been received from—

**A.**—Dr. R. E. Apperly, Lond.; Dr. F. M. Allen, Morriston, New Jersey; Mr. A. Altivant, Lond.; Air Ministry, Dept. of Civil Aviation, Lond.; Messrs. Allen and Hanburys, Lond.; Messrs. George Allen and Unwin, Lond.

**B.**—Mr. W. V. Ball, Lond.; Prof. A. E. Boycott, Radlett; Mr. J. Barker, Rotherham; Mr. T. G. D. Bonar, Lond.; Mr. L. L. Burton, Dargaville, New Zealand; Brooklyn Cardiological Society, Sec. of; Dr. C. W. Barr, Philadelphia; Miss R. M. Barclay, Edinburgh; Mr. L. E. Barrington-Ward, Lond.; Dr. R. St. J. Brooks, Lond.; Brighton and Sussex Medico-Chirurgical Society, Sub-Librarian of; Mrs. C. Brereton, Lond.

**C.**—Chelsea Hospital for Women, Lond.; Dr. W. Cramer, Lond.; Dr. R. Coope, Liverpool; Dr. H. P. Cholmeley, Forest Row; Central London Throat, Nose, and Ear Hospital, Sec. of; Child Study Society, Lond.; Dr. M. Coplans, Lond.; Dr. M. Cowhy, Dublin; Central Midwives Board, Lond.; Sir F. Colyer, Lond.; Prof. E. L. Collis, Cardiff; Chicago School of Sanitary Instruction; Civic Education League, Lond.

**D.**—Dr. S. R. Dyer, Lond.; *The Draper and Drapery Times*, Lond., Editor of; Dr. I. J. Davies, Cardiff; Dr. M. Davidson, Lond.

**E.**—Dr. G. Evans, Lond.; Mr. D. L. Eadie, Edinburgh.

**F.**—Dr. W. E. Falconar, Lond.; Dr. T. Fisher, Norwich; Dr. S. Flexner, New York; Prof. J. E. S. Frazer, Lond.

**G.**—Mr. H. Gardiner, Lond.; Dr. W. O. Greenwood, Harrogate; Dr. C. Gouldesbrough, Lond.; Great Northern Central Hospital, Lond.; Lt.-Col. E. Goodall, Whitchurch; Dr. G. Graham, Lond.

**H.**—Prof. H. Head, Lond.; Sir P. Hehir, I.M.S. (retd.), Westward Ho! Dr. J. A. Hadfield, Lond.; Harveian Society of London, Sec. of; Prof. L. Hill, Loughton; Sir W. Hale-White, Lond.; Dr. J. Haddon, Denholm; Dr. A. F. Hess, New York; Dr. R. C. Holt, Didsbury; Prof. W. G. Howarth, Lond.; Hospital for Sick Children, Lond., Sec. of.

**I.**—Institute of Hygiene, Lond., Sec. of; Illuminating Engineering Society, Lond.; Institute of Physics, Lond.

**J.**—Dr. H. Jones, Hereford; *Japan Medical World*, Tokyo.

**K.**—Dr. C. H. Kellaway, Oxford; King's College, Lond., Dept. of Theology; Dr. J. R. Kay-Mouat, Clifton; King Edward's Hospital Fund for London.

**L.**—Mr. D. M. Lindsay, Glasgow; Dr. J. D. Leigh, Sunderland; Dr. R. M. Ladell, Birmingham; Mr. N. C. Lake, Lond.; Mr. J. E. Lane, Lond.; Dr. H. A. Lediard, Carlisle; London School of Tropical Medicine, Sec. of; London Hospital Medical College, Sec. of; Dr. O. Langmead, Lond.

**M.**—Dr. P. Manson-Bahr, Lond.; Dr. A. D. Milne, Lond.; Medico-Legal Society, Lond.; Massage and Medical Gymnastics, Chartered Society of, Lond.; Dr. J. A. Murray, Lond.; Dr. J. W. McLeod, Leeds; Mr. T. H. Morse, Deal; Medical Supply Association, Lond., Manager of; Manchester French Hospital.

**N.**—National Council for the Unmarried Mother and Child, Lond.; National Housing and Town Planning Council, Lond.; National Baby Week Council, Lond.; National Association for the Prevention of Infant Mortality, Lond.; Lord Northampton, Lond.

**P.**—Panel Committee for the County of London, Sec. of; Mr. F. C. Pybus, Newcastle-on-Tyne; Dr. A. D. Pithie, Southsea; Dr. J. H. Pelc, Prague.

**R.**—Royal Institution of Great Britain, Lond.; Royal Society, Lond.; Rontgen Society, Lond.; Dr. H. M. Rainsford, Lond.; Dr. W. C. Rivers, Worsboro' Dale; Royal Medical Benevolent Fund, Lond.; Royal Society of Medicine, Lond., Librarian of.

**S.**—Dr. H. Spence, Lond.; Prof. E. Spearman, Lond.; Messrs. C. J. Sawyer, Lond.; Prof. W. Stirling, Manchester; *School Health News*, New York; Shantung Christian University School of Medicine, Lond., Sec. of; Dr. K. Sibley, Lond.; Society for the Propagation of the Gospel in Foreign Parts, Lond., Sec. of; Messrs. Sharland and Co., Lond.; Savoy Hotel, Lond., Directors of; Mr. J. Spofforth, Lond.; Dr. H. Stanley-Jones, Netley.

**T.**—Dr. R. Thompson, Lond.; Dr. J. J. Thomson, Middleton-in-Wharfedale.

**U.**—Under-Secretary of State for India, Lond.; Universal Exhibitions, Lond., Organising Sec. of; University of Glasgow, Librarian of.

**V.**—Dr. A. L. Vischer, Basel; Mr. W. G. Verniquet, Kingsbridge.

**W.**—Dr. E. Walford, Cardiff; Dr. E. L. White, Southampton; Dr. S. I. Welsh, Lond.; Dr. J. W. T. Walker, Goring-on-Thames; Dr. C. M. Wilson, Lond.; Walsall General Hospital; Dr. H. M. Woodcock, Lond.

**Y.**—Dr. J. Young, Lond.

# Notes, Short Comments, and Answers to Correspondents.

## CONGENITAL WORD-BLINDNESS.[1]

BY J. E. WALLACE WALLIN, PH.D.,
DIRECTOR, ST. LOUIS PSYCHO-EDUCATIONAL CLINIC AND SPECIAL SCHOOLS.

IN articles and books on the intelligence of mentally subnormal school children congenital word-blindness has been largely overlooked as a specific defect or as a possible factor in the pedagogical retardation of the pupils, in spite of the fact that the condition has been recognised as a nosological entity for over 40 years. The concept has remained scarcely more than an abstraction, interesting as a theory but of little practical moment, to those who have studied pedagogically retarded children by measurement of intelligence by the Binet-Simon scale or group intelligence tests. Yet analysis of individual cases shows conclusively that some children fail to advance in school chiefly because, owing to the presence of some degree of word-blindness, they are partially or totally unable to learn to read. They are thus seriously handicapped in all school work requiring mastery of printed pages; and many word-blind children, normal or merely backward in intelligence, have been diagnosed as feeble-minded and assigned to special classes for mental defectives. Illustrative cases in point have already been cited,[2] and many more could easily be added from the writer's experience. In this paper I propose to quote from an analysis made of some of the data gathered in 95 consecutive cases from St. Louis examinees whose reading disability has been attributed to visual aphasia or dyslexia.

### *Definition of Word-blindness.*

But to explain what is meant by word-blindness—the name given by Kussmaul, who first recognised the condition in 1877,[3] does not refer to the inability to see printed or written characters, but to the inability to understand or interpret them. It is a form of asymboly which affects the imaging, remembering, and interpretation, but not the perception, of printed symbols. Word-blindness is only an instance of "mind-blindness" or "psychical blindness." In the latter condition all visual imagery is obliterated, so that no visual images or memories of any kind can be interpreted. Word-blindness may affect only letters or Arabic numerals, or certain groups of letters or figures, or certain syllables, or whole words or certain groups of words, or certain languages, but not others, or musical notes (note blindness or sensory amusia), or there may be various combinations of these symptoms; it is always accompanied by agraphia,[4] and possibly by auditory aphasia (inability to understand spoken language, attributed to a lesion in the first temporo-sphenoidal gyrus).[5] Intermittent cases have been recorded.

### *Lesions Connected with Word-blindness.*

In the case of acquired word-blindness focal lesions have been discovered in the secondary visual area, in the angular gyrus and in the supra-marginal gyrus, in the left parietal lobe of right-handed persons. If these areas are seriously affected there is complete word-blindness. It is also believed that acquired word-blindness may result from destruction of the fibres leading from both sides of the centre of visual perception[6] (the "primary visual centre" in the posterior part of the occipital lobe) to the angular gyrus. It is assumed that lesions of congenital or hereditary origin, or lesions due to birth trauma or to injuries in early life, or an arrest of development which affect the same cerebral areas, will account for congenital word-blindness; this fact was first recognised by W. Pringle Morgan. The congenitally word-blind child cannot learn to read, or learns to read only with the greatest difficulty. A considerable difference has also been observed in the character and severity of these cases, which has led to the supposition that the more severe degrees are due to lesions or imperfections in the angular gyrus, and the lighter degrees to partial interruptions in the connecting fibres between the primary (perception) and secondary (memory) visual centres.

I shall apply the name visual aphasia to the more severe degrees and the name dyslexia[7] to the lighter degrees, employing word-blindness as the generic term.

### *Diagnosis.*

There is no pathognomonic symptomatology of word-blindness. A differential diagnosis cannot be safely arrived at until visual defects, auditory defects, idiocy, imbecility, and possibly other as yet unrecognised conditions have been ruled out, and until the child has been given every reasonable opportunity to learn to read script and print, and has tried to do so, under the guidance of a skilled teacher. If such a child is able to name designated objects or pictures of objects, and to spell the names orally (especially short words), but is unable to pick out or recognise the corresponding names when shown in print or script, word-blindness is presumably present.

### *Average Age, Intelligence, &c.*

The average chronological age of this group of word-blind children was 11·07, the average intelligence age 8·85 (based on the 1911 scale for 31 cases and the Stanford scale for 64), the average intelligence retardation 2·2 years, and the average intelligence quotient 80·3.

The average number of years spent in school at the time of the examination was 4·4 (counting ten months to the year), based on 88 pupils whose attendance records were available. The average grade in which the pupils were reported as doing "successful work" was 1·9, based on the available records of 44 pupils. Unfortunately, the grade in which the pupils were able to do successful work in the different branches was reported only in a limited number of cases. In reading the average successful grade was 1·8 (for 14 pupils), in spelling 2·4 (for 8 pupils), and in arithmetic 2·9 (for the same pupils as reported in reading). Reading, according to the school record, was their poorest subject. This is also shown by the reading test given in the clinic. The average time taken to read the Binet selection (54 words) and the average number of memory units reproduced for the word-blind subject, all the subjects examined in the Pittsburgh and St. Louis clinics up to August, 1917 (which we shall refer to as the subnormal group), and the epileptic children examined in New Jersey years ago,[8] who classified in the intelligence ages as indicated, are given in the following table:—

| | *A.—Time in Seconds to Read Binet Selection.* | | | | | | | | *B.—Number of Memories.* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Intelligence ages— | | | | | | | | Intelligence ages— | | | |
| | VIII. | | IX. | | X. | | XI. | | | | | |
| | No* | Sec. | No* | Sec. | No* | Sec. | No* | Sec. | VIII. | IX. | X. | XI. |
| Subnormal† | 94 | 107·9 | 115 | 72·7 | 154 | 51·9 | 89 | 30·0 | 5·4 | 7·6 | 8·2 | 9·6 |
| Epileptics... | 11 | 145·1 | 9 | 85·7 | 22 | 66·3 | 9 | 31·4 | 3·5 | 4·7 | 6·8 | 6·1 |
| Word-blind | 5 | 162·8 | 5 | 141·2 | 6 | 130·6 | 2 | 87·0 | 7·0 | 7·8 | 7·1 | 14·0 |

* Number of subjects included. † The word-blind cases examined during the same period were not eliminated from this group.

It should be explained that only those subjects are included who were able to read the entire selection through, and many of them secured considerable aid from the experimenter on difficult words. All of the word-blind cases (and many of the epileptics) made numerous mistakes and were helped considerably. Even thus only 18 dyslexia cases got through the selection. Data were compiled from the dyslexia pupils who read part of the selection with aid, and the dyslexia and visual aphasia pupils who attempted to read the easiest material used in the first grade first quarter in the St. Louis schools,[9] but these results will not be referred to here. The reading selection used was that given on p. 130 of our Experimental Studies of Mental Defectives, except that the corresponding Stanford passage was used with the word-blind cases examined since September, 1917. The selections are of equal length, and probably about equally difficult.

It will be observed that the time required to read the selection by the word-blind cases is considerably longer in every intelligence age than the time required by the subjects in either of the other two groups. In age 10 it is two and a

[1] Presented, in part, with analyses of cases, before Section L, Education, of the American Association for the Advancement of Science, Dec. 30th, 1919.

[2] The Problems Concerning a Psycho-educational Clinic in a Large Municipality, Mental Hygiene, 1920, 105ff. See also references to the writer's contributions in the bibliography at the end of this article.

[3] William Broadbent had five years previously reported the condition as complicated by speech disturbances.

[4] Difficulty of writing. In the usual form monosyllables can be recognised, but longer words do not resemble the intended words. When letters cannot be formed, which is rare, the subject makes meaningless strokes, sometimes resembling stenographic or runic characters.

[5] Among the thousands of children examined only one was classified as a case of auditory aphasia; the case is described in the last reference at the end of this article. I agree with Kerr that this type of defective word imagery is exceedingly rare.

[6] From the right and left calcarine fissures.

[7] Word-amblyopia has been similarly employed by Claiborne.

[8] We have not included records of adults. See Experimental Studies of Mental Defectives, 1912, pp. 70f and 80f.

[9] Such lines as "I can run," "I am a boy," "I can play ball," "She is my little baby girl."

half times, and in age 11 almost three times as long as the time required by the subnormals. On the other hand, the word-blind subjects, in spite of their slowness in reading, reproduced considerably more memory units than the epileptics in every intelligence age, while they reproduced considerably more than the subnormals in age 11, slightly more in ages 8 and 9, and slightly less in age 10 only. These results are consistent with the theory that word-blindness is due to defective visual word imagery and the interpretation of such imagery and not to defective apprehension or retention of the ideas secured from printed words, provided they can be secured at all.

*Absence of Visual and Auditory Defects.*

The vast majority of the 85 pupils in this group, who were given a physical examination by the regular school inspectors of hygiene, did not have any significant visual or auditory defects. There were 4 cases of tinnitus and 1 of otitis media. No impairment of auditory acuity was noted. There were 2 cases of myopia, 1 of hypermetropia, 4 of astigmatism, 3 of strabismus, and 4 of conjunctivitis. We are satisfied that the word-blindness cannot be traced to physical defects in the visual or auditory sense organs in the majority, if indeed in any, of the subjects considered in this group. The defect is central. Other incidental abnormalities noted in the group include the following: chorea, 1 boy and 1 girl; infantilism, 1 boy; speech defectiveness, 7 boys and 1 girl; psychopathy, 2 boys; neurotic make-up, 3 boys and 2 girls; and conduct difficulties, 8 boys and 1 girl. It is not believed that these anomalies have any direct connexion with word-blindness.

*Incidence of Word-blindness.*

The incidence of word-blindness (4·48 per cent.) among the 2116 school cases examined in this series is greater than the combined incidence of epileptics, psychopaths, mongols, and cretins.[10] The large majority were examined primarily because they were thought to be mentally defective, sometimes merely because of an inability to learn to read; some of these cases proved on examination to be intellectually normal or merely slightly retarded, and others were referred primarily because of their difficulty in reading, although they were known to have had good intelligence; but we believe that the majority of pupils of fair or good intelligence who were subject to specific disability in reading were not referred, because of the necessity of restricting examination to those most defective in intelligence. For these reasons we do not venture to estimate the ratio of word-blind cases among all the St. Louis elementary school children. No accurate figures are available from other school systems. C. J. Thomas has estimated that there is one word-blind case for every 2000 boys in the London schools, but Warburg noted 14 word-blind cases among 2000 ordinary pupils in Cologne, and seven among special school children. We are convinced that if the dyslexia cases are included, the incidence of congenital word-blindness is much greater than has been thought to be the case. Of the cases we have studied, the milder form, dyslexia (3·6 per cent. of all examined, or 82·1 per cent. of the word-blind), is about five times as prevalent as the more serious form, visual aphasia (0·7 per cent. of all examined, or 17·8 per cent. of the word-blind).

*Sex Incidence.*

Word-blindness is apparently to some extent a sex-limited disability. In this group of cases it was about four times as prevalent among the boys as among the girls, the ratio being 5·71 per cent. for the boys and 1·47 per cent. for the girls. The writer believes he has collected the largest group of congenital word-blind cases ever presented in the literature. According to Sydney Stephenson, only 14 cases had been reported by six writers up to 1904. J. Hinshelwood, who has contributed most to our knowledge of the condition, has described a dozen cases in his latest treatise. He met with 31 congenital and acquired cases in 15 years.

The facts are not available on which to frame even a plausible explanation of the sex difference. It is suggested that visual aphasia is more prevalent than auditory aphasia, because the reading and understanding of written words was acquired much later in the history of the race than the hearing and interpretation of spoken words. But this analogical fact will not explain the sex difference found in word-blindness, because, historically, boys have probably been taught reading longer than girls. But speech defects are more frequent among boys than among girls; the difficulty in word-blindness may be traceable to the difficulty of translating a visual word or letter symbol into its appropriate auditory symbol. Although the source of the difficulty has been considered to be a defect in visual word imagery, it is possible that the seat of the trouble may be in the connexions between the centres for images for spoken words and for images for printed words. This may be indicated as an important question for investigation. Whatever the seat of the defect, the result is that the subject finds it difficult to pronounce or read the printed words. In those who cannot read words but who can copy them from the printed page the simplest explanation is to assume that the mechanism for translating the visual symbols into spoken symbols is disturbed, while the mechanism for translating the visual signs into graphic symbols is intact. There are doubtless word-blind subjects in whose case the difficulty of reading is complicated by motor aphasia, or a lesion in Broca's convolution.

*Normal Intelligence in the Word-Blind.*

As already pointed out, our word-blind cases as a group did not present any significant visual or auditory sense defects. Measured by the Binet "ball and field" design, and immediate memory span tests, it was determined that they were superior to the subnormal group. The tests revealed no peculiar defects in auditory or visual imagery, apart from possible defects in visual word imagery.

It had been held that the aphasias represent merely one of the intellectual disorders involving language (Adolf Meyer), and that they are accompanied by a lowering of the level of general intelligence (Wundt, Pierre Marie). On the other hand, many children subject to word-blindness have been reported to be normal in intelligence and even precocious (Hinshelwood). In practically all of such reported cases, the judgment as to the normality of the child's intelligence was based on his school report or on general impressions of intelligence, and not on standardised tests. In point of fact, our word-blind cases vary from an intelligence quotient of 54 to 104; 12 per cent. were diagnosed as normal or almost normal (retarded) in intelligence, and 85 per cent. as subnormal (the diagnosis being deferred in 2·1 per cent. of the cases). Only 5·2 per cent. were classed as feeble-minded, none of these grading lower than morons or potential morons; almost 36 per cent. were classed as backward and almost 41 per cent. as border-line. The only difference of any consequence between the visual aphasia and dyslexia cases is the greater proportion of normals among the former, which may, of course, be merely an accidental difference in this group.

Although at least 85 per cent. of our cases were subnormal in general intelligence, we are not justified in concluding that the percentage of subnormality would be equally high in an unselected group of word-blind children. Had we selected all the pupils in the schools who were conspicuously deficient in reading it is possible that the ratio of those having normal intelligence might have been higher. At any rate, the statement that there is a lowering of the general intelligence in word-blind cases cannot be sweepingly applied to all cases.

*Attempted Differentiation of "Pure" Word-Blindness.*

Hinshelwood has drawn a distinction between word-blindness, dyslexia, and alexia. Word-blindness represents a grave degree and dyslexia a slight degree of reading disability, due to a focal lesion in the centres mentioned above in a brain which is normal or undamaged in other areas, while alexia is applied to the condition in mental defectives who are suffering from a generalised brain defect. He holds that the symptoms of word-blindness or dyslexia must be "pure," by which he means that there must be no other accompanying symptoms of brain defects. We find no evidence whatever for any such distinction between word-blindness and dyslexia on the one hand and alexia on the other hand. We have discovered no qualitative difference between word-blindness in a moron, in a borderliner, and in a normal. The differences found in word-blindness are, like those of general intelligence, differences in degree and not in kind. Intelligence varies from profound idiocy to genius; there are many grades between these extremes, but no sharp lines of demarcation can be discovered between the grades. Similarly, word-blindness varies continuously from a state of profound visual aphasia to a slight degree of dyslexia. It may eventually be possible to distinguish more groups of this disability than has yet been done, but there will be no gaps between the groups; the nature of the fundamental reading disability will probably be the same whether or not the symptoms are "pure"; the differences will be quantitative and not qualitative. It would, of course, be meaningless to speak of an imbecile as subject to word-blindness, because the highest grade of imbecile merely approaches the bottom of the curve of capacity in reading; but our records clearly show that the highest grades of the feeble-minded (the so-called low-grade morons) are subject to the same kind of reading disability as pupils who are merely backward or normal in intelligence. Like the latter, they do distinctly poorer work in reading (and often in spelling as well) than in many other school subjects.[11] But no qualitative

[10] See "The Problems Confronting a Psycho-Educational Clinic in a Large Municipality," Mental Hygiene, January, 1920.

[11] For illustrative cases other than those given in this article see the writer's references to my contributions in the bibliography.

difference has been discovered between the reading disability of the word-blind mental defective and the word-blind backward or normal child.

*A Neurological Parallel.*

On the neurological side parallel differences will probably be found. Different brains will show many degrees of soundness, perfection, or defectiveness involving different areas. Various degrees of fineness in structural organisation probably exist in many areas of the brain in most persons. The existence of multiple imperfections would complicate and aggravate the word-blindness, but it would not produce a different kind of word-blindness. Reading disability is due to word-blindness when there is a defect in the secondary visual centre concerned with the imagery of words or in the connecting fibres between the secondary and primary visual centres, whether or not the symptoms are "pure."

*Conclusion.*

To conclude with a practical point, word-blind children who are not feeble-minded should be assigned to special reading disability classes, where various methods and devices of teaching reading may be tried. We shall find that some children will be reached by some methods, others by other methods, but when it has been shown that a child cannot be taught to read by the intensive application of various methods, teaching should be given orally. In fact, one of the advantages of assigning a word-blind child to a reading disability class is that he may secure from the teacher's lips the instruction which fits his level of intelligence and which he cannot secure through the printed page because of his inability to read. The usual practice is to assign word-blind pupils to ungraded classes or special schools or to place them in the first grade. But in such classes the teachers must ordinarily teach so many subjects that they cannot specialise on reading. Moreover, even if large use is made of the oral method of presentation, the instruction may not meet the child's intellectual needs. The oral instruction in a first grade or in a school for mental defectives would not fit the intellectual level of a word-blind but intellectually normal child of 10. His reading and intellectual needs can only be met in a properly conducted reading-disability class. We have frequently urged the establishment of an experimental class of this type in St. Louis, but the financial difficulties confronting the schools have prevented any action being taken in the matter.

*Selected Bibliography.*—Bronner, Augusta: Psychology of Special Abilities and Disabilities, 1917. Collins, Joseph: The Genesis and Dissolution of the Faculty of Speech, 1898. Fernberger, Samuel W.: Possible Effects of the Imaginal Type of the Subject on Aphasic Disturbances, American Journal of Psychology, 1919, 327 f. Hinshelwood, James: Congenital Word-Blindness, 1917. (The classic in the field. Contains a good bibliography.) Kerr, James: Congenital or Developmental Aphasia, School Hygiene, 1918, p. 61 f. Schmitt, Clara: Developmental Alexia: Congenital Word-Blindness, or Inability to Read, Elementary School Journal, 1918, 680 f and 757 f. Wallin, J. E. Wallace: Meeting the Needs of the Mentally Handicapped Child in School, Ohio Bulletin of Charities and Correction, 1919, July, p. 62, and Journal of Education, 1919, 227 f.; The Achievement of Mental Defectives in Standardised Educational Tests, School and Society, 1919, 250 f.; The Achievement of Subnormal Children in Standardised Educational Tests (a monograph not yet in print).

## EUGENICS v. CIVILISATION.

ON April 12th, under the above title, Mr. F. C. S. Schiller, D.Sc., delivered a lecture at the rooms of the Royal Society, on behalf of the Eugenics Society. Eugenics, he said, as a science was a study of the conditions of improvement of the human race; but improvement meant making better, and that implied a standard of good. Civilisation, which was an achievement of man and not a congenital quality like, for instance, sex, also implied a standard of good. A baby born of civilised parents had to acquire civilisation; it had to be impressed upon the child by training, and if subsequently the individual liked civilisation it was an acquired taste. The transmission of civilisation in the social order was effected in very complex ways, and were the mechanism of this transmission to be destroyed or seriously damaged civilisation would disappear in one generation, as would probably be the case in Russia. It was often regarded as a fatal objection to eugenics that what would be the best type of man was not known, and therefore could not be produced. Though there was truth in this objection, a knowledge of what was good was equally involved in the notions of progress and of civilisation. The eugenist at least knew enough to deplore the suicidal organisation of our present civilisation, which was arranged so as to eliminate not only the qualities which were good but even those thought to be good, and so was ruining the human race. The reason was that in all civilised societies the birth-rate was relatively high in the lower social strata, and so low in the higher that it had to be recruited from the lower. As social promotion was everywhere the reward of merit—of the qualities a society valued and regarded as good—and as social structure was now less rigid than in the past, merit rose more easily than formerly. This promotion, however, meant inclusion in a class in which the numbers were halved in each generation. This recognition of merit was also biologically its capital punishment, and civilisation was actually extirpating the very qualities it considered valuable. The organisation of society at the present moment must be pronounced apallingly dysgenic, it had become an instrument of deterioration of the human race, and if progress was still being made it was being made in the mechanism by which the world was controlled, which was quite independent of what was good. This dysgenic effect of civilisation was no new thing, though it was now probably proceeding faster than formerly; it explained why aristocracies always died out, why the physical development of the human race had been arrested, and why there was no reason to think that modern races were mentally superior to the ancients. Militarism tended to eliminate itself. All through history the fighting races had fought themselves to extinction and all through history the meek had inherited the earth. There had been going on in every community an internal selection which might profoundly change the ideas and type of the people.

*Retrogressive Brain Development in Man.*

The bodily development of man had long ago come to a standstill. There had been no improvement in the human type since the beginning of history, nor was there reason to think that man was intrinsically more intelligent. Brain development had apparently been retrogressive for a long time, and it was a mere assumption that we use smaller and more compact brains more efficiently. The only power which man had developed was a resistance to microbic disease. It was a mistake to think that intelligence was not an important factor in savage life. The savage could not afford to be a fool or to breed fools, and in the ordinary affairs of life he was far more capable of fending for himself than those who disparaged him. Nor was he more helpless in the City of London than a bank clerk on a primitive island, or a professor in a jungle. In savage life the fool and idiot could not grow up to leave behind an adult brain. The human stock must at one time have been progressive, or else it would never have developed out of the ape. It was still progressive wherever social conditions conduced to a preferential survival of the better portions of the stock rather than of the worse. This occurred among savages subjected to severe natural selection, so that weaklings could not be preserved. This also occurred among barbarians where the well born were more prolific than the lower classes. It could occur in civilised societies if they recognised the error of their ways and the need of thorough-going eugenic reform. The recognition of the race-deteriorating tendency of civilisation was a new and important fact, but once recognised it could be counteracted by a variety of expedients, which, though difficult, were not impracticable. As for the theoretical difficulty that we did not know precisely what were the good types to be preferred, it was essentially nugatory. In a general way the good could be discriminated from the bad, and by cautious experiments the bad could be further eliminated.

## PUBLIC HEALTH OF ST. VINCENT.

THE Registrar-General's estimate of the population on Dec. 31st, 1919, was 53,210. The birth-rate for the year was 24·8, and the death-rate 20·67 per 1000. Illegitimate births were 68·1 per cent. of the total births. The general health continued to be good throughout the year. Rain fell on 208 days in 1919, the greatest fall for one day being 3·61 inches on August 23rd.

## "THIS CONCERNS *YOU*."

THIS is the title of a pamphlet by Dr. S. G. Moore, medical officer of health for Huddersfield (London: The St. Catherine Press. Pp. 16. 2*d*.), who states in a sub-title that it was written for the Honourable Nathan Straus, of New York. It is a warning of the "danger which lurks in raw milk," and a plea for the universal adoption of pasteurisation. Detailed directions are given for home pasteurisation, but though the mother of an artificially-fed infant is advised not to pour the milk into another vessel, but to let the child feed from the bottle in which it comes, no illustration is given of a type of nipple which would convert the milk bottles illustrated into suitable feeding bottles. Moreover, the section of advice to mothers is self-contradictory, since in the second paragraph the mother is enjoined to feed the child every three hours during the first month, whereas further down on the same page the appropriate food for the first month is said to be eight 3 oz. bottles a day, one every two and a half hours. However, any effort to bring home to the public the need for pure milk, whether on antiseptic or on aseptic principles, should be commended, and Dr. Moore defines what he means by pasteurisation in the March number of *National Health*.